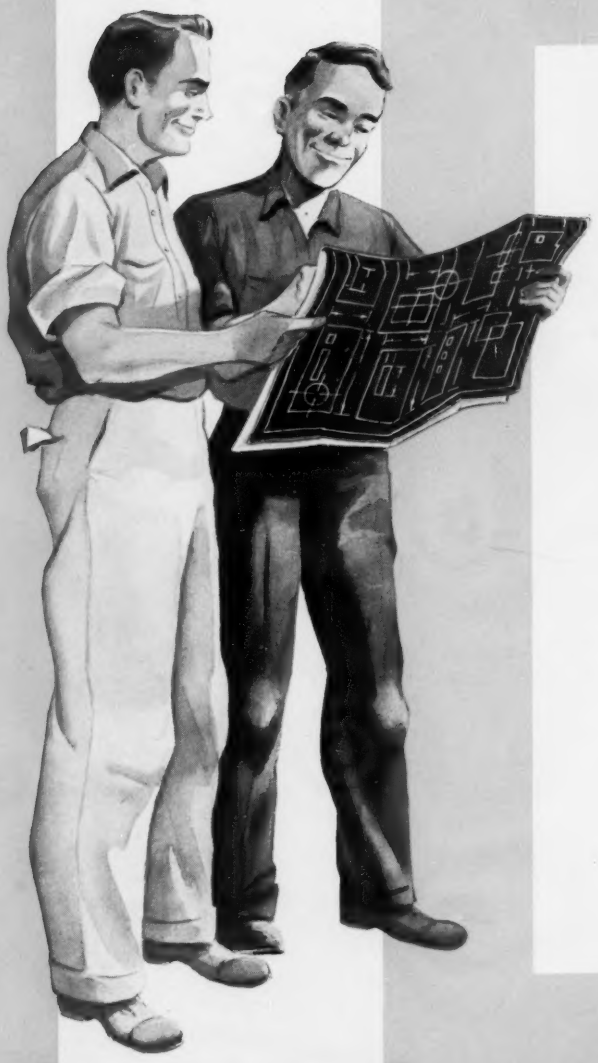
FOUNDRY

MARCH
1958

A PENTON PUBLICATION



How Foundries Train Engineers

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✔ GE Foundry Modernization

Large program will double production in 10 years in same buildings — p. 70

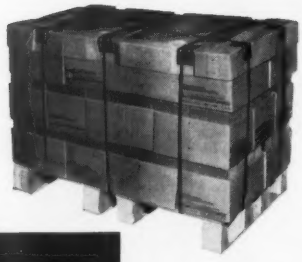
✔ Cast Epoxy Core Driers

Discussion of construction of inexpensive cast epoxy driers — p. 84

✔ Profit at Low Volume

How you can maintain profits when casting volume declines — p. 110

new **FERROCARBO®** packaging...

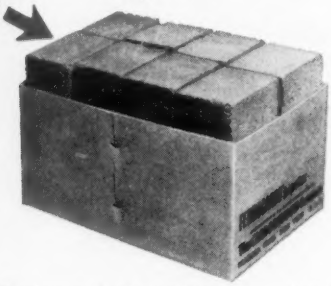


a typical pallet of FERROCARBO Briquettes showing interlocking pattern and entry feature. Lift tests prove exceptional strength up to 60 times greater than conventional packaging.

improves material handling

CARBORUNDUM, constantly alert to customers requirements, has introduced a new FERROCARBO package. This has been designed by CARBORUNDUM packaging engineers to meet its foundry customers' known problems of storage, handling and loading of the patented additive — FERROCARBO Briquettes.

Sturdy, 16-unit open top cartons, packed in an interlocking pattern, provide a lower, more compact pallet load. Greater accessibility is afforded by a 4-way entry feature, thus reducing handling time and costs to a minimum. Strong, weather-proof covers protect the pallet under outside storage conditions. Also, the complete FERROCARBO package is adequately labeled to insure immediate recognition.



Sixteen briquettes are packed in sturdy, more compact individual cartons of open top design for quick, easy loading.

FERROCARBO Briquettes by CARBORUNDUM are widely used by foundrymen to produce sound castings with required strength, ductility and hardness properties. Tests in leading foundries have demonstrated that FERROCARBO-treated iron has considerably better machining properties due to structure control and freedom from segregation.

ACTUAL CASE HISTORY INFORMATION is available on how FERROCARBO produces more machinable iron regardless of metal composition. Write for booklet A-1409, Electro Minerals Division, Department 84-82, The Carborundum Company, Niagara Falls, N. Y.

ELECTRO MINERALS DIVISION

CARBORUNDUM

REGISTERED TRADEMARK

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84-82 R

Circle 551 on Page 51

B.F.Goodrich report:

Photo courtesy of Whirl-Air-Flow Corp., Minneapolis, Minn.

Pipe carries sand the easy way

B. F. Goodrich improvements in rubber brought extra savings

Problem: In this foundry, workmen used to push wheelbarrows loaded with sand to the coremakers. Now the sand is simply blown through those overhead pipes to hoppers all over the building. Only one trouble.

A flexible hose was needed to switch the sand from one pipeline to another. (See inset.) Rubber hose was tried. The swirling sand quickly wore holes in it. Another kind stretched so much from the constant flexing that it jammed the switch.

What was done: When a B.F.Goodrich man heard of the problem he recommended a hose, specially developed by B.F.Goodrich to handle rough materials. It is made with a special wear-resisting rubber, so tough it outlasts hard steel 10 to 1 on many jobs. The hose has a specially treated fabric reinforcement that keeps it from stretching.

Savings: The B.F.Goodrich hose was tried. Instead of digging in and cutting, the sharp particles of sand simply bounce off the extra-soft rubber lining. It has now given 2 years of service and shows no signs of wear or stretch. In fact, the company making this equipment is now using only B.F.Goodrich hose.

For information: This hose is one of hundreds of kinds B.F.Goodrich makes for thousands of industrial uses. Your B.F.Goodrich distributor can recommend a hose exactly fitted to meet the special requirements of your work. And, as a factory-trained specialist, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-293, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Circle 554 on Page 51

Whatever you pour, there's a

FEDERAL GREEN BOND BENTONITE

tailored for you!

for IRON and NON-FERROUS CASTINGS

specify GREEN BOND **L-J***

(*Low-Gelatinating)

The highest grade, pure Western Bentonite ideal for bonding regular synthetic sand systems containing fines, cereals, and residual clay. The L-J characteristic makes it possible to attain high green and dry compression strength with the addition of a minimum quantity of water. FEDERAL GREEN BOND L-J permits a thinner slurry and faster mulling; reduces the strain on pumps when used in a slurry system.

The "Best of the Bentonites" for 32 years, old reliable GREEN BOND is absolutely uniform, unadulterated and free from chemicals.

Send for L-J TEST SAMPLE

Archer-Daniels-Midland Company
Federal Foundry Supply Div.
2191 West 110th Street
Cleveland 2, Ohio

Will you please have your Technical Representative arrange for a test of GREEN BOND BENTONITE L-J in our foundry.

NAME_____

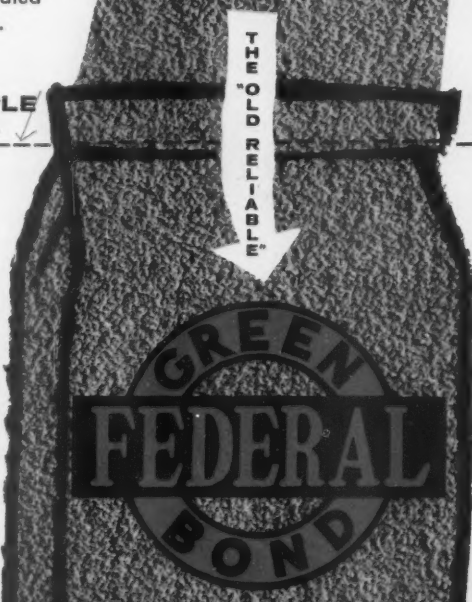
TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____

STATE_____



for STEEL CASTINGS

specify GREEN BOND **H-J***

(*High-Gelatinating)

GREEN BOND H-J means high gelatinating, and is mined exclusively for steel foundries where new or reclaimed sands are used. New sands, having no organics, fines, or residual clays to retain moisture, require the addition of high-gelatinating Bentonite for moisture retention.

FEDERAL GREEN BOND H-J absorbs and retains water better in such sands than any Bentonite you can use. This material completely meets steel founders' requirements.

GREEN BOND H-J may be furnished either granular or pulverized to conform to various mulling and air conditioning systems.

Send for H-J TEST SAMPLE

Archer-Daniels-Midland Company
Federal Foundry Supply Div.
2191 West 110th Street
Cleveland 2, Ohio

Will you please have your Technical Representative arrange for a test of GREEN BOND BENTONITE H-J in our foundry.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____

STATE_____

Circle 555 on Page 51

Archer-Daniels-Midland company

FEDERAL FOUNDRY SUPPLY DIVISION

2191 West 110th Street • Cleveland 2, Ohio

Producers of core and facing binders, sea coal, sand stabilizers, core and mold coatings, and foundry facings

FOUNDRY
A PENTON PUBLICATION

March 1958
Volume 86 — Number 3

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(For addresses of branch offices, see Page 237)

FOUNDRY is edited primarily for management, production, technical, and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve all key foundry personnel on a personal or routed basis. A limited number of copies is supplied at no cost to educational institutions.

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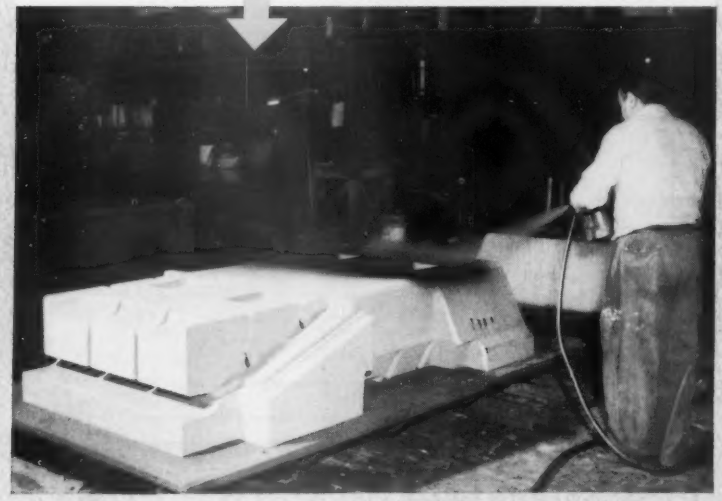
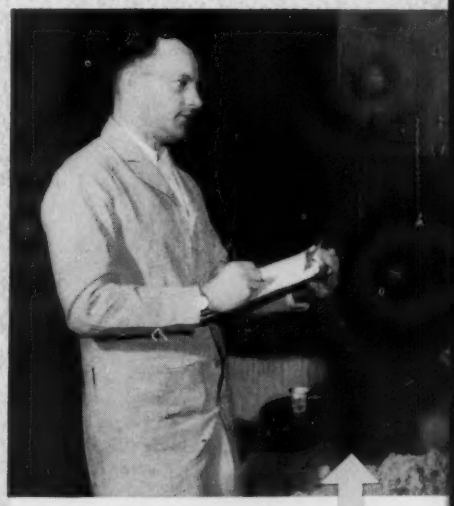
HILL-

John Mokren and Joe Zargel, coremakers at Hill-Acme are stripping the box from a 3000-lb. LIN-O-SET core which is typical of much of the core work in this modern foundry. Two of these giants form the core assembly for a 3½-ton machine tool base pan casting. Note the delicate undercut on the left side of the core, which involved considerable time and trouble prior to the use of LIN-O-SET.

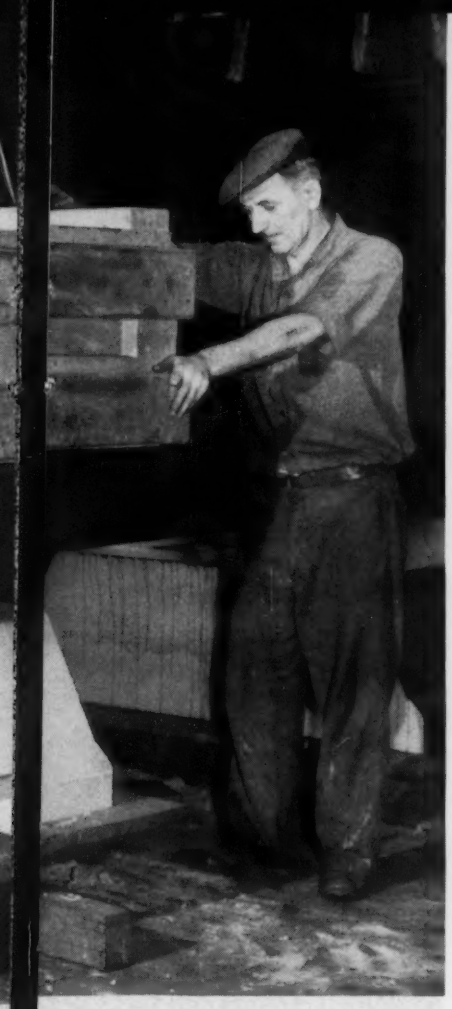
Hill-Acme castings are known for their excellent finish. They attribute this to high density of LIN-O-SET cores, and the use of FEDERAL No. 801 PLUMBAGO COREWASH. Illustration shows Paul Colella spraying on FEDERAL No. 801.





Otto Spirek, plant superintendent at Hill-Acme, discusses mixing procedures with Dan Chester, ADM Technical Service Mgr., who makes periodic checks on procedures, and stands ready to apply his specialized knowledge to core problems as they arise.

ACME reports on value of...



LIN·O·SET

½ the fabricating time
½ the baking time

. . . and vastly improved casting finish. These are the primary reasons why HILL-ACME COMPANY of Cleveland, Ohio, switched from conventional core oil to LIN-O-SET.

Larry Rayel, ADM Representative, suggested that Hill-Acme try LIN-O-SET as an experiment. The huge, complicated cores presented constant problems: for instance, they had to use back-up sand to reinforce delicate undercuts; it was difficult to hold dimensional stability and at the same time attain sufficient flowability for easy ramming; they had to "baby" green cores due to their extreme size and weight; then the large cores had to bake for two nights.

After a demonstration by ADM Technical Service Manager, Dan Chester, it was decided to put LIN-O-SET into the entire core operation.

Now, a year later, these are the recognized benefits: after a short air-curing period, core boxes are stripped faster and easier without danger to the core, and the core has absolutely no sag after stripping; there is less need for rodding; high green strength of the cores as drawn permits safer handling, reducing green core breakage; minimum ramming and tucking are required due to low green strength and high flowability of LIN-O-SET sand as discharged from the muller. All in all, total fabrication time for LIN-O-SET cores is estimated to be at least 50% less.

Baking time was reduced from two nights to one night. Excellent collapsibility of the cores reduces cleaning to a minimum.

Perhaps a demonstration of LIN-O-SET in your foundry will bring about attractive savings for you. Write for LIN-O-SET technical bulletin.

Archer-Daniels-Midland company

FEDERAL FOUNDRY SUPPLY DIVISION

2191 West 110th Street • Cleveland 2, Ohio

Aim toward better castings through the use of Archer Quality Supplies:

GREEN BOND H-J
High-gelatinating Bentonite

GREEN BOND L-J
Low-gelatinating Bentonite

CROWN HILL
Sea Coal

FEDERAL
Sand Stabilizer

FEDERAL
Core Washes

FEDERAL
Plumbagos

FEDERAL
Core Pastes

LINOIL
Core Oils

INDUCTOL
Fast-baking Core Oils

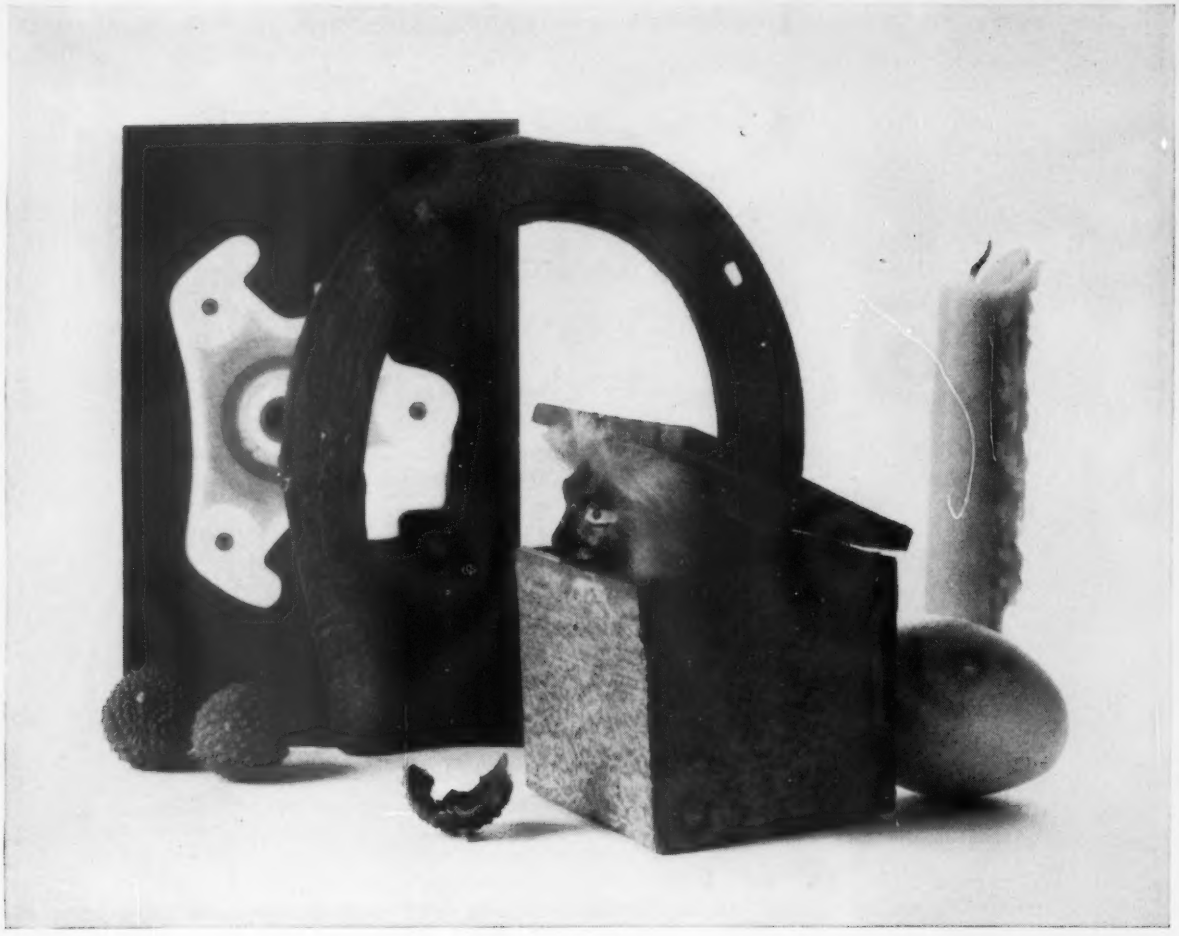
LIN-O-SET
Air-setting Core Binders

ADMIREZ
Foundry Resins

ADCOSIL
CO_2 Binders

LIN-O-CEL
Sand Stabilizer

FRE-FLO
Parting Compound



How to candle a horseshoe!

If castings were like eggs a simple candle would solve all inspection problems.

Getting inside things to "have a look around" is unfortunately a somewhat more critical process.

And since life itself often depends upon the delicate layer of silver that reveals flaws, only an X-ray film having superb gradation and tonal separation can be depended on in routine as well as specialized work.

And tonal separations are the very characteristic that makes Ansco X-ray films special. That's because only Ansco X-ray films are critically coated to tolerances that provide unequalled quality and uniformity. Ansco X-ray films . . . for candling horseshoes!

Ansco

X-ray

Ansco, a division of General Aniline & Film Corp., Binghamton, N. Y.

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Stop Costly Water Damage In
HOW THE SILICONES MAN HELPED...
Deliver a Hot Blast to Cold Jets!
HOW THE SILICONES MAN HELPED...
Light up the life of a double-decked commuter
UNION CARBIDE
SILICONES

HAVE YOU MET THE

SILICONES MAN?

He'll tell you the story of the "impossible" rubber that helps deliver a hot blast to cold jets . . . or the case of the 3600 mph wind tunnel. Perhaps you'll want him to tell how he helped seal a delicate gyroscope . . . or show you the brick that floats. Here's a man with a thousand success stories about UNION CARBIDE Silicones.

But the Silicones Man is in reality many men—in sales engineering, technical service, research, and development—all working together as the Silicones Division of UNION CARBIDE. Between them they possess tremendous knowledge about the wonderful world of silicones. There's a Silicones Man in most major cities. Put him to work on your problems today. For a complete description of many silicone products, write for the booklet "Look to UNION CARBIDE for Silicones," Dept. FY-3, Silicones Division, Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

UNION CARBIDE TRADE-MARK SILICONES

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In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Toronto 7, Ontario

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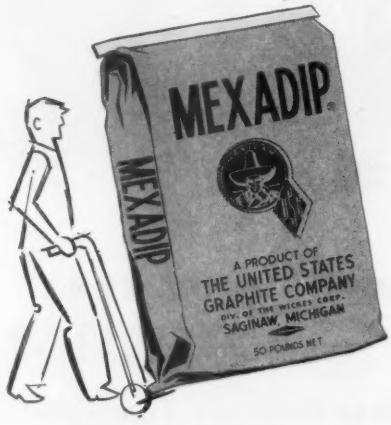
WASHES · WAS

no matter what the application . . . there is Mold Wash for every foundry need . . . or

SIPAC®

with only the addition of water, produces a bright, gold-colored coating with fine, smooth surfaces, using any foundry sand. It's non-carbonaceous and inert and will not react with any molten metal, including grey iron and steel. Resists flaking and completely protects core surfaces. You get improved casting quality. Sipac is available in 55 gallon drums, ready for mixing and dilution to desired Baume — even to a scale of 32 — without settling.

MEXICAN® VV FLAKE ("volatile vehicle")— meets the growing demand for good mold and core wash suited to carbon dioxide mold-core hardening process. Completely compatible with isopropyl alcohol, oleum spirits, kerosene or similar agents, Mexican VV Flake provides extra refractory protection . . . improves skin hardness . . . gives better casting quality. Comes in paste form, suitable for application by spraying or dipping.



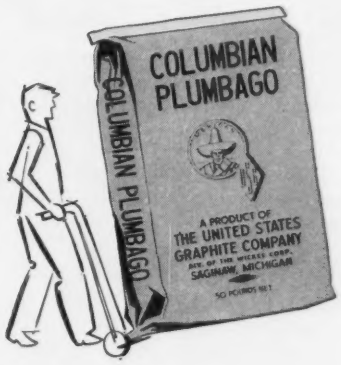
MEXADIP® — refractory core coating containing its own binder, requires only water to prepare it for use. Will not ferment, produces a very uniform, even coating over entire core with practically no sagging, running or dripping. Use it throughout foundry for green or baked cores, ferrous or nonferrous foundry practice.

THE UNITED STATES

GRAPHITAR® CARBON-GRAPHITE • **GRAMIX®** POWDERED METAL PARTS • **MEXICAN®** GRAPHITE PRODUCTS • **USG®** BRUSHES

HES · WASHES

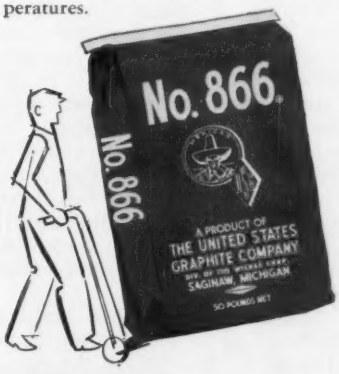
a United States Graphite Company Core or one may be engineered to your requirement



MEXICAN® COLUMBIAN PLUMBAGO— versatile wet blacking used for loam work, green or dry sand or torch dried molds where soft coat with high resistance is required. Suitable for all types of castings, including those of over 25 tons, high steel mixtures and castings poured at high temperatures.

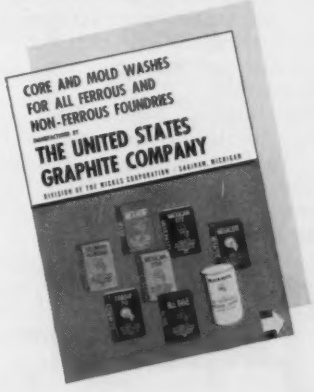
SLICK RITE®— compounded from a base of high quality flake graphite to produce best slicking qualities, Slick Rite is applied to green sand molds by hand rubbing, tooling or brushing. Excellent casting quality obtained when mixed with water and molasses to produce wet lead for spraying molds and cores.

MEXICAN® 172—high refractory wet blacking with binder. For application to both molds and cores of heavy sectioned castings where best possible finish is required under severe pouring conditions.



No. 866® —is a wet blacking without binder. Provides soft coating with good refractory properties for molds and cores of medium and light sectioned castings. Also makes good blacking for bell end cores in pressure pipe manufacture. Can be applied by spraying, brushing or swabbing at 40-45 Baume.

MEXICAN® 700 — is particularly suitable for large molds and dry sand cores of high carbon iron such as cast iron rolls and ingot mold castings poured at intermediate temperatures. Contains no binder.



Write today for engineering bulletin No. 17 giving complete details and application methods of core and mold washes for all ferrous and nonferrous foundries.

GF-244-2

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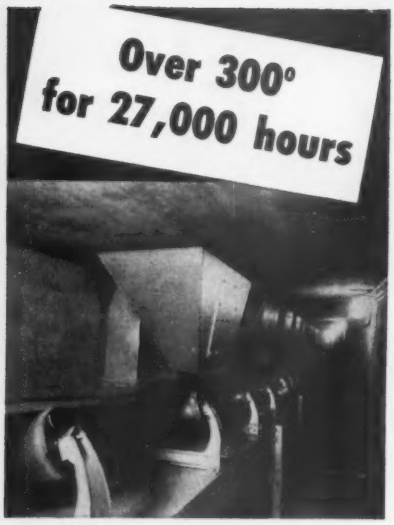

Imperial Hot Belt still going strong after 27,000 hours

The shakeout conveyor belt pictured above (236′ of 24″ x 5 ply) has already handled over 200,000 tons of red hot sprues and 300° to 400° sand for Briggs Manufacturing Co. It is still in excellent condition!

Unusual? Not for Imperial* Insulated Sahara* Belting, job-designed for the destructive high-temperature conditions of foundry service.

Job-designed belting. Imperial Sahara Belts are protected against heat damage by asbestos insulation and special impregnating compounds. Double-stitched, INNERLOCKED* construction positively prevents plies from separating.

Other Imperial Sahara Belts are designed to handle temperatures to 600°. To find out which Imperial Belt best fits your requirements, send for new Belting Catalog and Engineering Handbook.

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Imperial
BELTING COMPANY
1755 S. Kilbourn Ave., Chicago 23, Ill.

You expect MORE from Imperial . . . and you get MORE!

Mail this coupon today for NEW Belting Catalog and Engineering Handbook

Name_____

Address_____

Circle 560 on Page 51

With the Editors

SPECIAL Shell Molding Report: What is the future of the shell molding method of producing castings? The answer to this and other questions concerning that process will be included in a special editorial report on Shell Molding to be presented in the April issue.

Producers of shell molded castings have co-operated in giving us considerable data on what they are doing with the shell molding process and this information will be tabulated for presentation in the report. These foundrymen also were asked to comment on the following questions: 1. In your opinion, what will be the future trends in the production of shell molded castings? 2. What can equipment suppliers do to aid your shell mold production? 3. What can material suppliers do to aid shell mold production? Answers were interesting and varied, and will be presented in some detail.

To help round out the picture of where we are and where we are going, producers of resins and manufacturers of shell molding equipment also were asked four questions, and their answers will be presented.

Producers of resins were asked: 1. Do you believe that new or improved resins will be developed within a reasonable time which will help produce better castings? 2. Do you see any possibility of reducing the cost of resin to foundrymen through development of new resins or new resin manufacturing processes? 3. Will new developments or practices permit more uniform control of resins supplied foundrymen? 4. What is your opinion of the future of shell molded castings?

Equipment manufacturers were asked: 1. What will be the future trends in shell molding equipment? Will future machines be faster, simpler, sturdier, more flexible, or cheaper? 2. Do you see improvements in methods of handling sand to the pattern? Can resin segregation be eliminated? 3. What will be the trends in shell molding sand reclamation? 4. What is your opinion of the future of the shell molded castings industry?

The report will include case studies on five foundries producing shell molded castings, an article on patterns for shell molding, and a report on recent research in the field.

The editors believe you will find the report in the April issue very interesting and instructive.

—o—

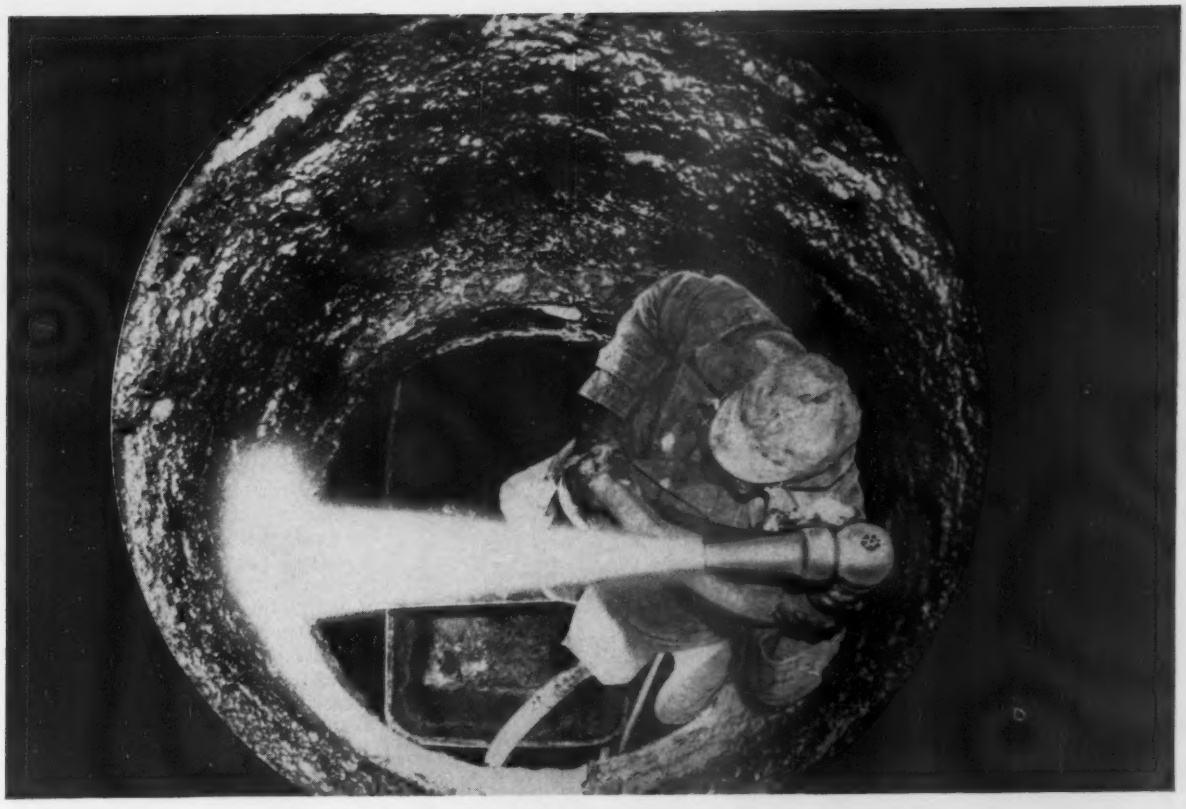
Delport Honored: The editors are mighty proud that our colleague, Vincent Delport, European editor, has been awarded an honorary membership in the Association Technique de Fonderie of France for the great services he has rendered the French foundry industry in a liaison capacity.

Congratulations, Vincent, for this well deserved honor.

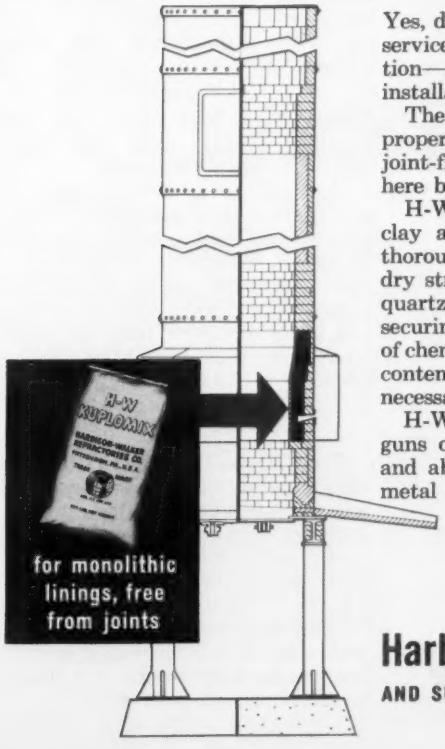
—o—

Visiting Filipinos: A Philippine Foundry and Machine Shop Productivity Study Team has been visiting foundry centers in the United States under the auspices of the International Co-Operation Administration. Plants were visited in the San Francisco, Chicago, and Cleveland areas. Friday, Feb. 7 was spent at the Penton Building in Cleveland, visiting with trade association representatives and editors of FOUNDRY.

During a visit of five members of the group at the Whiting Corp., Harvey, Ill., on Feb. 3, the photograph reproduced below was taken. From left to right, front: Catalino



The value of H-W KUPLOMIX is measured in the dollars it saves!



Yes, degrees of quality are measurable in dollars . . . governed by service life, resolved to the amount consumed per unit of production—maintenance costs—labor savings resulting from ease of installation.

The unusual optimum combination of physical and chemical properties of this modern refractory which provides monolithic joint-free linings is accounted for by various important factors here briefly mentioned.

H-W KUPLOMIX is made with an exceedingly refractory bond clay and quartzite having a silica content of 99% plus. The thoroughly weathered clay imparts the most desirable workability, dry strength and high temperature ceramic set. The high purity quartzite having equiaxed dense grains is carefully sized for securing maximum density and strength. Careful quality control of chemical composition and physical properties, including moisture content for the avoidance of segregation, assures the uniformity necessary for the use of granular refractories with best results.

H-W KUPLOMIX is easy to apply either by air-placement guns or by ramming. It is exceedingly resistant to the impact and abrasion of the cupola charge, the erosive action of molten metal and slags and to the chemical attack of slags.

World's Most Complete Refractories Service

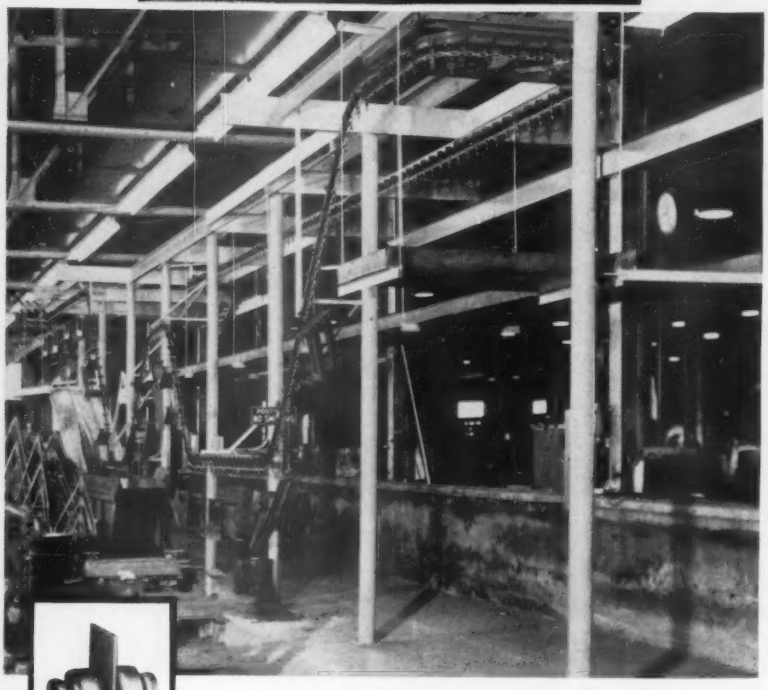
Harbison-Walker Refractories Company

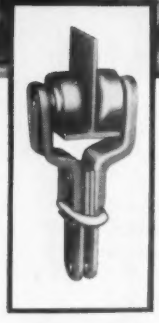
AND SUBSIDIARIES General Offices: Pittsburgh 22, Pa.

Circle 561 on Page 51

A NEW LIGHT-DUTY TROLLEY CONVEYER . . . ENGINEERED AND STANDARDIZED BY

MATHEWS





A #232 Trolley Conveyer Applied for painting, drying and storage of miscellaneous parts.

This light-duty Trolley Conveyer has several features which make it a leader in the field of overhead conveying. It is comparatively easy to install, with hanger-rod and angle hanger supports available to meet any supporting requirements. Standard turns, vertical bends, and takeup assemblies are made in sizes and types to fit even the most difficult layout.

The drive units have a wide range of capacities and horsepowers, with conveyer speeds ranging from one to fifty feet per minute.

The #232 wheel was specifically designed for trolley conveyer service and is an outstanding performer. This equipment is priced reasonably and is available from stock, being assembled from standard parts throughout.

Write for Bulletin T-58 today.

MATHEWS CONVEYER COMPANY

GENERAL OFFICES . . . . . ELLWOOD CITY, PENNSYLVANIA
PACIFIC COAST DIV. . . . MATHEWS CONVEYER COMPANY WEST COAST, SAN CARLOS, CALIFORNIA
CANADIAN DIVISION . MATHEWS CONVEYER COMPANY, LTD., PORT HOPE, ONTARIO.

MATHEWS

(Member Foundry Equipment Manufacturers Association)

O. Luciano, president and general manager, Pacific Engineering Co., Manila, and team leader; Santos B. Barrows, superintendent, Bataan National Shipyards, Mariveles, Bataan; Casto L. Cosme, superintendent, National Shipyards & Steel Corp., Manila, and team secretary; rear, Maximo M. Mercado, superintendent, Atlantic, Gulf & Pacific Co., Manila; Tomas L. Parpana, president and general manager, Parpana Machinery Mfg., Manila; and Leslie A. White, project manager, International Co-Operation Administration, Washington.

—o—

Not Enough: Safety is something that has to be worked at all of the time. While an employee may have knowledge of good safety habits, he is a potential accident statistic unless he practices the safety habits constantly.

With this fact in mind, Allis-Chalmers Mfg. Co., Milwaukee, has underway a 15-month program based on the theme "Knowing's Not Enough," and stressing the importance of practicing safety techniques, both at work and at home. A film entitled "Knowing's Not Enough," meetings, direct mail to the employee's home, employee publications, decals for auto bumpers, and fact folders are some of the props to be employed.

Every foundry manager might take a leaf out of the A-C book and undertake an all-out program of safety now. Such a program benefits both management and employees.

—o—

New Type Face: This issue of FOUNDRY appears in a new type dress.

It is known as Cornell, and it was selected after consultation with type experts and extensive studies by the Penton Press Division, the Art Department, and the editors. All believe it is cleaner, easier to read, and more attractive than the face which has been in use for many years.

We hope you will like it too.

—o—

Too Little—Too Late: The sad story of what might have been was told recently when a return card for a group cost meeting held by a trade association in the foundry field carried the following doleful notation:

"Please remove our name from your mailing list. Unable to attend meeting because we did not learn enuff about costs soon enuff."

F.G.S.

LOOK AGAIN AT COSTS

Pretty grim prospect? If *your* high cleaning room costs are for the birds, there's an easy way to cut snagging time and whip the situation. Switch to CINCINNATI (PD)° SNAGGING WHEELS, the greatest grinding development in years!

It doesn't take any trouble to find out what our customers think of CINCINNATI (PD) SNAGGING WHEELS. They're sky-high in their praises of the fast, easy cutting action. Our customers report, too, that POSITIVE DUPLICATION (PD) means another saving. "ON GRADE" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

CINCINNATI (PD) WHEELS are made in vitrified and resinoid bonds for both ferrous and non-ferrous foundries and are available in a complete variety of sizes and shapes. *And these better, cost-cutting* (PD) SNAGGING WHEELS *are priced no higher than ordinary wheels.*

So if you want to escape hovering worries and hold down costs while improving performance, see your CINCINNATI Grinding Wheels Distributor or contact us direct. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—only CINCINNATI (PD) WHEELS give you

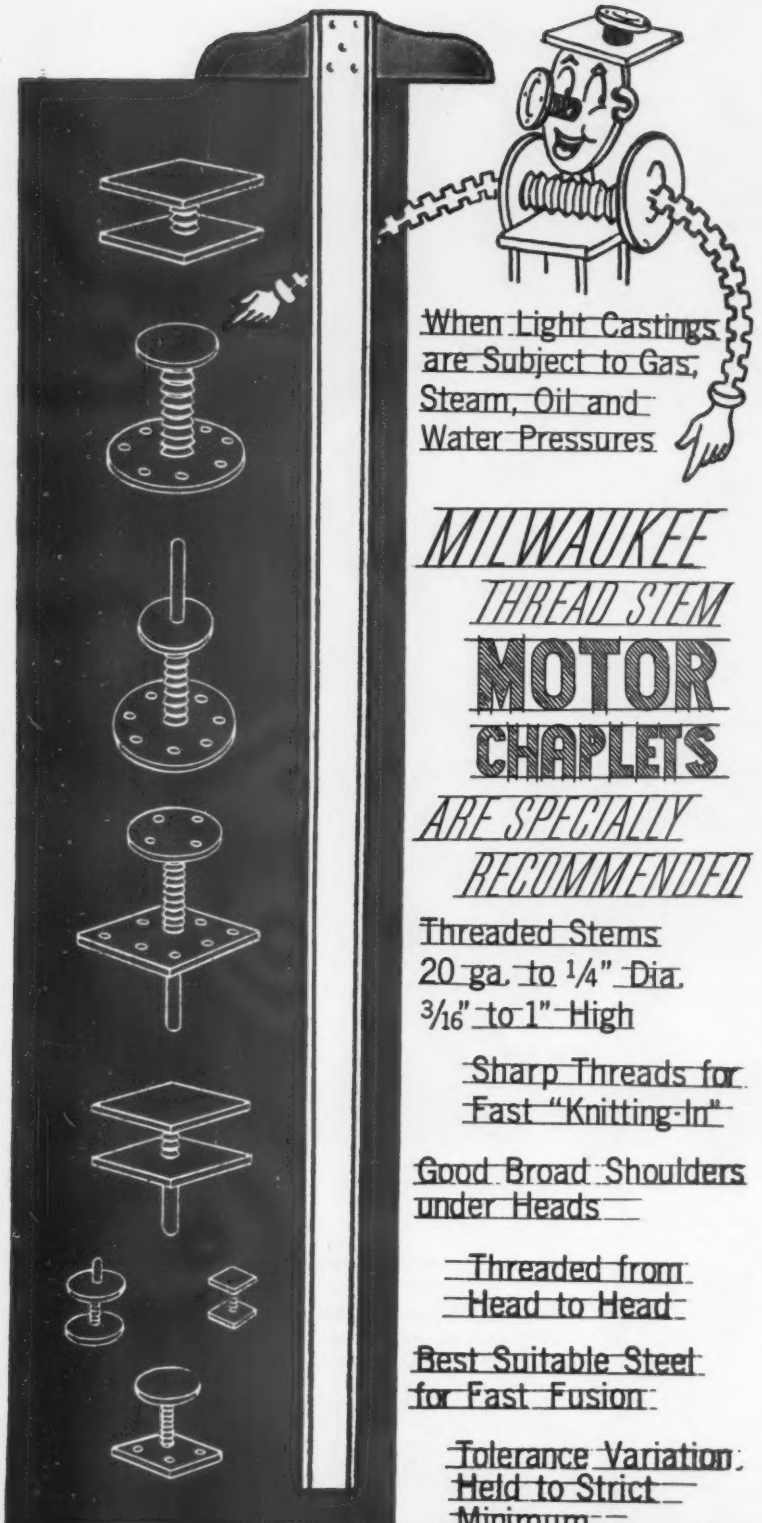
PD POSITIVE DUPLICATION

CINCINNATI°
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U. S. Pat. Off.

Circle 563 on Page 51


When Light Castings are Subject to Gas, Steam, Oil and Water Pressures
MILWAUKEE
THREAD STEM
MOTOR
CHAPLETS
ARE SPECIALLY
RECOMMENDED
Threaded Stems
20 ga. to 1/4" Dia.
3/16" to 1" High
Sharp Threads for Fast "Knitting-In"
Good Broad Shoulders under Heads
Threaded from Head to Head
Best Suitable Steel for Fast Fusion
Tolerance Variation Held to Strict Minimum
Milwaukee Chaplet & Mfg. Co.
1025 SOUTH 40th STREET • MILWAUKEE 46, WISCONSIN

Calendar of MEETINGS

Mar. 12-13—Foundry Educational Foundation, college-industry conference, Hotel Statler, Cleveland.

Mar. 17-18 — Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago.

Apr. 8—Material Handling Institute, spring membership and directors meeting, Cleveland Hotel, Cleveland.

Apr. 9-10 — Malleable Founders' Society, Market Development Conference, Edgewater Beach Hotel, Chicago.

Apr. 14-17—Design Engineering Show, International Amphitheatre, Chicago.

Apr. 21-23—Association of Iron and Steel Engineers, spring conference, Dinkler-Tutwiler Hotel, Birmingham, Ala.

Apr. 21-26—American Industrial Hygiene Association, annual meeting, Claridge Hotel, Atlantic City, N. J.

May 1-8 — American Society of Tool Engineers, annual meeting and convention, Convention Center, Philadelphia.

May 5-6—American Institute of Mining, Metallurgical & Petroleum Engineers, conference on properties of high-strength steels, Penn-Sheraton Hotel, Pittsburgh.

May 8-9 — Magnesium Association, annual closed meeting, Grove Park Inn, Asheville, N. C.

May 8-9—Refractories Institute, annual meeting, Homestead, Hot Springs, Va.

May 8-10—American Material Handling Society, western regional material handling show, Great Western Exhibit Center, Los Angeles.

May 12-16—American Society for Metals. 1st southwestern metal congress and exposition, Automobile Bldg., Dallas, Tex.

May 13-15—Investment Casting Institute, spring meeting, Edgewater Beach Hotel, Chicago.

May 14-16—Society for Experimental Stress Analysis, spring meeting, Manger Hotel, Cleveland.

May 19-23—American Foundrymen's Society, 62nd annual convention and exhibition, Public Auditorium, Cleveland.

May 19-20—Non-Ferrous Founders' Society, annual meeting, Carter Hotel, Cleveland.

May 21-22—American Iron & Steel Institute, annual meeting, Waldorf-Astoria Hotel, New York.

June 9-10—Malleable Founders' Society, annual meeting, Homestead, Hot Springs, Va.

June 9-12—National Materials Handling Exposition, Public Auditorium, Cleveland.

June 9-13—International Automation Exposition and Congress, Coliseum, New York City.

June 12-13 — American Foundrymen's Society, annual chapter officers conference, Hotel Sherman, Chicago.

June 19-21—American Foundrymen's Society, foundry instructors seminar, Case Institute of Technology, Cleveland.

June 22-27—American Society for Testing Materials, annual meeting, Statler and Sheraton-Plaza Hotels, Boston, Mass.

Sept. 10-11—American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago.

Sept. 15-19—Instrument Society of America, annual instrument - automation conference and exhibit, Convention Hall, Philadelphia.

Sept. 22-23—Steel Founders' Society of America, fall meeting, Homestead, Hot Springs, Va.

Oct. 8-10—Gray Iron Founders' Society, annual meeting, Sheraton Park Hotel, Washington.

Oct. 16-18—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 18-21—Conveyor Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 27-31—American Society for Metals, national metals exposition and congress, Public Auditorium, Cleveland.

Nov. 10-12—Steel Founders' Society of America, technical and operating conference, Carter Hotel, Cleveland.

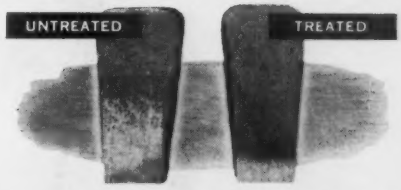
"No machining complaints since I used SMZ alloy"

You can eliminate chilled corners and hard spots in gray iron castings with ladle additions of "SMZ" alloy. Machining rates can thus be improved by as much as 25 per cent, giving you more satisfied customers.

"SMZ" alloy is the most widely used inoculant in the iron foundry industry. As little as 2 to 4 pounds of "SMZ" alloy per ton of iron are sufficient to eliminate chill in light castings. For harder irons of lower carbon and silicon contents, a larger addition of the alloy may be required.

For information on how "SMZ" alloy can improve the machineability of your castings, contact your ELECTROMET representative. Ask for the booklet, "SMZ Alloy—An Inoculant for Cast Iron."

ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.



These chill blocks show how "SMZ" alloy reduced chill in a 3.15% carbon, 1.80% silicon iron.

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

The terms "Electromet," "SMZ," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Circle 565 on Page 51

His new grinding technique

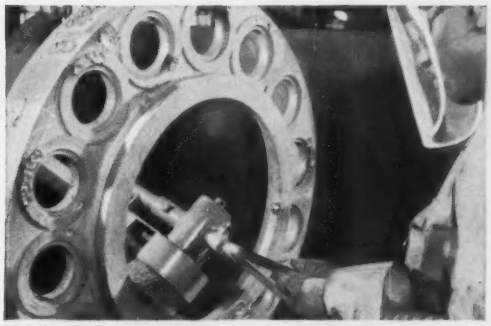
Twenty-eight years ago Jack O'Sullivan was running a swing-frame grinder for Crucible Steel... now he's President of Engineered Sales Co., one of New Jersey's largest abrasive distributors. He knows grinding from the operator's point of view and from the cost accountant's.

New baby swing-frame takes weight load of portable grinder off operator . . . enables him to grind smooth, flat surface without accidental scars and nicks due to fatigue.

Big foundries have big grinding problems. For example, Cooper Alloy Corporation, pioneer in the production casting of stainless steel valves and fittings, had this one: they found that some grinding jobs just couldn't be done with big swing-frame grinders. Yet they were backbreakers when done with portables . . . expensive, too.

cuts costs and back-aches

They *were*, that is, until Bay State distributor Jack O'Sullivan came up with an idea. Working with Bay State and Fox Grinders, Inc., he devised a baby swing-frame that used the conventional cup and raised hub disc wheels normally used only on portables. This enabled Cooper's operators to grind hard-to-reach surfaces and notch or cut off sprues, gates and risers . . . without fatigue . . . and with a great deal more speed and accuracy.



Tricky I. D. grind demands a light, precise touch with a coarse-grained cup wheel (tapered or straight). Operator is free to concentrate on accuracy.

Versatility of new grinding set-up permits operators to use Bay State raised hub disc wheels ("hat" wheels) for notching and cutting off sprues, gates, risers.

Like Jack O'Sullivan, *all* Bay State representatives are more than just grinding wheel salesmen. That's why they often come up with ideas that result in basic operating improvements. Why not call in *your* Bay State man? **Better grinding at lower cost – that is his business.**

BAY STATE WHEELS of PROGRESS

BAY STATE ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts. *Distributors:* All principal cities.
In Canada: Bay State Abrasive Products Co., Ltd., Brantford, Ontario.
Branch Offices and Warehouses: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh.

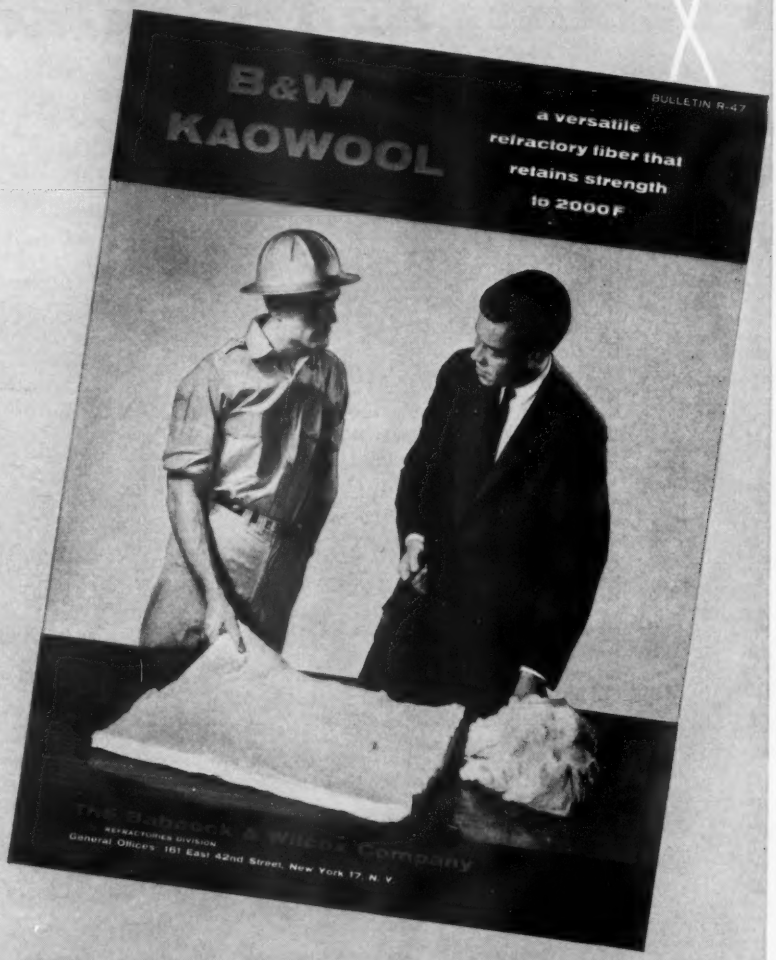
Circle 566 on Page 51

New Bulletin on

B&W KAOWOOL

Gives data on many uses of 2000 F refractory ceramic fiber

B&W Kaowool, the 2000 F refractory fiber, is being successfully used for expansion joints in walls, roofs, around burners and in car tops of ferrous and non-ferrous heating furnaces. B&W Kaowool blankets are also serving as insulation in the pre-heating and stress relieving of large welded units. Write for new bulletin giving helpful data on B&W Kaowool, the multi-purpose ceramic fiber that withstands high temperature service.



B&W REFRACTORIES PRODUCTS:
B&W Alimul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool

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GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R6918

YOU'LL DO A BETTER JOB

with H. V. ADAMS DESIGNED

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.

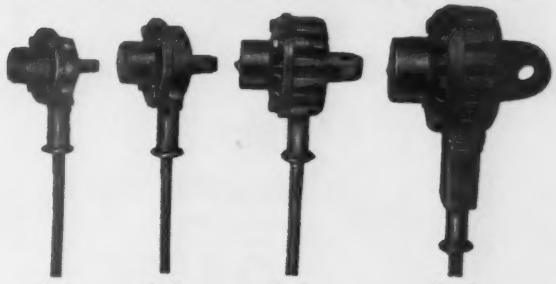
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

- SPEED
- ECONOMY
- SAFETY
- LONGER LIFE
- GREATER SIFTING CAPACITY

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- No. 11 NOISELESS TYPE VIBRATOR
- A-20 ELECTRIC VIBRATOR
- RED ELECTRIC KNEE SWITCHES
- "ROTO" ADJUSTABLE BIN VIBRATOR
- 2 MIN. UNIVERSAL FINENESS TEST SIFTER.
- UNIVERSAL TRIPOD CARRIER

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

2221 Orchard Street - Chicago 14, Illinois

Established 1918 Cable Address: "Rotoplane Chicago" H. V. ADAMS, Mgr.

Circle 568 on Page 51

for higher performance it's

OHIO MAGNETS

Size for size, Ohio Magnets lift larger loads over longer periods because they *operate cooler*. So for extra magnet lifting power, extra magnet value—always specify Ohio Magnets and Ohio Magnet Controllers. There's a type and size for every lifting job. Send for free copy of Bulletin 112, or consult the Yellow Pages for Ohio offices in principal cities.

AA-1477

THE OHIO ELECTRIC MFG. CO.
5400 DUNHAM ROAD • MAPLE HEIGHTS • CLEVELAND, OHIO

ohio ELECTRIC

CHESTER BLAND
President

Ohio Also Makes Separation Magnets • Nail Making Machines • Fractional Horsepower, Shell and Torque Motors

Profit-boosters for your portables

Snagging with the latest economy wheels —44 ALUNDUM abrasive and B-11 resinoid bond— brings you many new "Touch of Gold" advantages*

44 ALUNDUM abrasive is non-premium priced . . . made differently, for extreme toughness and ruggedness . . . cuts faster, grinds cooler and lasts longer than other non-premium priced aluminum oxide wheels . . . thoroughly job-proved in foundries throughout the country.

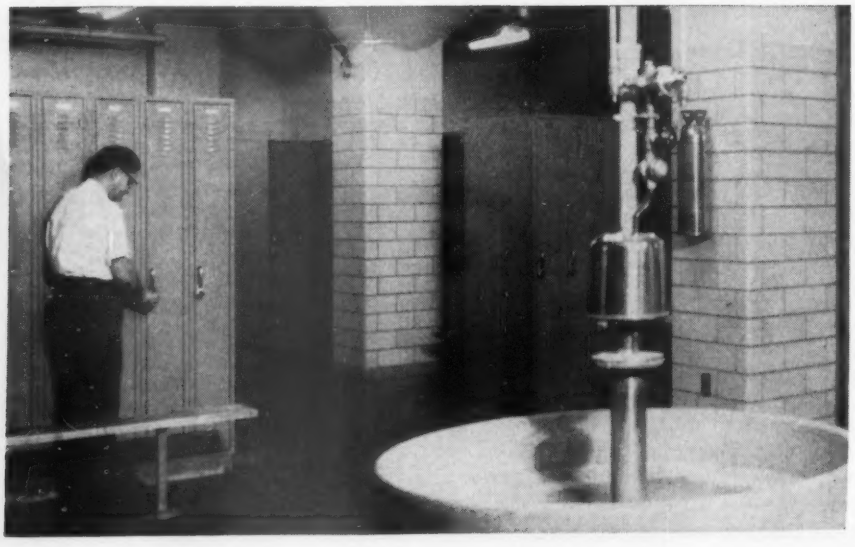
B-11 resinoid bonded wheels have more uniform structure and better balance . . . "hug that work" closer, with less vibration and bounce . . . are made to closest possible duplication, in half-grade increments evenly spaced across the entire hardness scale.

On your portable grinders, as on your other snagging machines, Norton-developed wheels of "44" plus "B-11" are abrasive and bond teams that will speed cleaning room operations, reduce operator fatigue and cut grinding costs. Your Norton Distributor will gladly arrange test runs in your plant. See him, or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries A-4

NORTON
ABRASIVES
Making better products... to make your products better

NORTON PRODUCTS:
Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING DIVISION:
Coated Abrasives • Sharpening Stones
Behr-cat Tapes



ON-THE-JOB PROTECTION for employee valuables and personal belongings is being provided by Republic Steel Lockers in industrial plants everywhere. They combine smart styling and design with simple construction for fast, easy installation. Republic Steel Lockers provide full inside-locker roominess, sanitation, safety. Bonderized finish is locked on . . . rust is locked out. Republic's Berger Division offers complete planning and installation service. Send coupon for full facts.

Versatile Chateaugay Pig Iron is specified for both castings shown at left. The producer, The Union Metal Manufacturing Company, Canton, Ohio, has found over the years that there is no better nor more economical means for producing consistently top-quality castings or for meeting their customers' strict requirements.

The flywheel is cast in sizes up to 36 inches in diameter. It is used in both stationary and automotive engines. Casting requirements call for a high degree of machinability since one surface serves as a clutch face, plus excellent density to resist the effects of turning at a very high rpm.

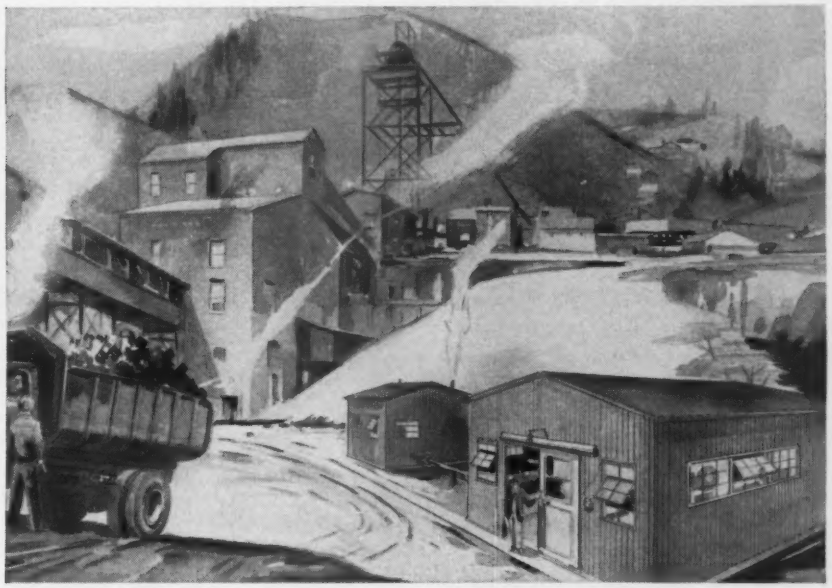
The melting pot, used by a large appliance manufacturer in melting aluminum, requires high heat-resistance and maximum density.

Chateaugay's uniform distribution of chemical elements produces a dense grain structure which results in economical machining—plus excellent wear-resistance. Other characteristics of Chateaugay are unequalled by any domestic pig iron, and its high carbon and unusually low sulphur, phosphorus, and manganese contents make it ideally suited for production of ductile cast iron.

A Republic Pig Iron Metallurgist will give you all the facts about Chateaugay and other Republic Irons. As the only producer of both Northern and Southern Iron, Republic offers industry's only complete line of all grades of merchant pig irons. Northern grades include Malleable, Bessemer, Foundry and Basic. Southern furnaces produce Foundry and Basic Irons.

The coupon will bring you prompt, expert metallurgical service and more information on Republic's complete line of irons.

ADDITIONAL SPACE REQUIREMENTS are met economically with Truscon's new line of "Budget Buildings". They are strong, lightweight, flexible — can be erected quickly at foundry, mill, factory, and field locations. No painting needed. Widths, 32 to 48 feet (in 4′ 0″ increments) . . . heights, 12 and 14 feet . . . lengths as long as you want them. Send coupon today for complete facts.



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World's Widest Range of Standard Steels and Steel Products

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☐ Have a Pig Iron Metallurgist call.

Send more information on:
☐ Chateaugay ☐ Northern Pig Irons ☐ Lockers
☐ Truscon "Budget Buildings ☐ Southern Pig Irons

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Announcing...

a special report on

SHELL MOLDING

to appear in the April 1958 issue of **FOUNDRY**

The shell molding process has come far since its introduction to foundries a relatively few years ago. Because of wide-spread interest in the subject and its stature as a major foundry process, the editors of FOUNDRY are preparing this comprehensive report on the subject.

4 MAJOR ARTICLES!

1 Report of returns from a special questionnaire

The editors have asked foundrymen 26 key questions to determine present uses of shell molding and practices in production. Opinion on future trends, equipment and material needs were solicited. *This will be one of the most comprehensive reports on shell molding ever published.*

2 Case histories on foundries doing shell molding

Several leading users of the shell mold process are being consulted and the detailed story of their operations will be told in this report. There will be much data of interest to foundries of all sizes and types in this presentation.

3 Patterns for shell molding

The special requirements of patterns for shell molding have been analyzed and will be discussed.

4 A look to the future

The editors have asked the resin and equipment suppliers for estimates of trends in the use of shell molding—their comments and prognostications on product development should be of interest to all foundrymen.

FOUNDRY

a PENTON publication / Penton Building / Cleveland 13, Ohio

Circle 572 on Page 51

FOR SPEED • FOR FLEXIBILITY • FOR ACCURACY • FOR UNIFORMITY
ANOTHER STEEL FOUNDRY GOES HYDRA-SLINGER!

New from the ground up . . . that's the Steel Foundry Division of Texas Foundries, Inc. at Lufkin. It is not only new, but modern in every respect . . . a leading example of foundry mechanization in the growing southwest. It was only natural for management to decide on the Sandslinger method for ramming all of their larger, miscellaneous patterns. And when it came to choosing a Sandslinger, the choice was Hydra-Slinger because the Hydra-Slinger offers all of the quality, speed and uniformity advantages of hydraulic control.

The new Hydra-Slinger is used in conjunction with a loop roller conveyor and rollover machine. Flasks up to 60 x 60 inches are rammed. Nearly all of the patterns are of wooden construction and pattern changes are made easily without interrupting production. Up to 100 large, heavily cored molds are made each day on a single shift.

The slinger operator is located at a control station in the center of the loop, where he has a perfect view of the ramming operation. The location was chosen as best for this installation, although modern Hydra-Slinger design provides a choice of ideal locations for the control station.

Texas Foundries chose the Hydra-Slinger for their new steel castings plant because it offered a combination of speed, flexibility, accuracy and uniformity unequalled by any other method.

Send for full information today to Beardsley & Piper, Div. Pettibone Mulliken Corporation, 2424 N. Cicero Avenue Chicago 39, Illinois.

Circle 573 on Page 51

only COLEMAN Dielectric® CORE OVENS

are built by foundry oven experts

Coleman Dielectric Core Ovens are engineered and built to provide every essential feature for better, faster core baking — electronically. Only Coleman can give you all of the following advantages:

1 SPECIALIZED FOUNDRY OVEN EXPERIENCE

Foundry ovens are our business . . . not a sideline. Coleman Dielectric Core Ovens are the product of over half a century of specialized experience in the design and construction of ovens for every foundry need.

2 AUTOMATIC CONTROL MECHANISMS

Automatic Load-Monitor controls conveyor operation . . . permits baking a greater variety of cores without constant adjustments . . . prevents shut-downs due to overloading. Automatic Grid Control adjusts power tube to varying loads. Recycle overload system automatically restores oven to operation after momentary overload, shuts down oven if unsafe condition persists.

3 COMPLETELY SAFETY ENGINEERED

All components are protected by locked doors and safety interlock system that instantly shuts off high voltage circuit when any door is opened.

4 SIMPLIFIED PUSHBUTTON CONTROLS

Motorized electrode, conveyor and power controls located on convenient, centralized panel. Electric meter indicates electrode height in inches.

5 FULLY ENCLOSED UNIT CONSTRUCTION

Oven, power generator and conveyor are combined into one compact unit for Greater Efficiency . . . Simplified Installation.

Coleman Dielectric Core Ovens are posting spectacular production records in Aluminum, Brass and Bronze, Gray Iron, Magnesium, Malleable and Steel Foundries.

For an unbiased opinion about the suitability of dielectric core baking for your foundry, consult a Coleman Oven Engineer. As builders of the world's only complete line of foundry ovens, we have no reason to recommend any but the best for your needs . . . we make them all.

WRITE FOR BULLETIN 657

• Bucyrus-Erie Company, Erie, Pa., can turn out 2000-3000 pounds of phenolic resin bonded cores per hour in their Coleman Model 75CD-6019 Dielectric Core Oven. Cores range in size from one pound to over 100 lbs.

• This Coleman Model 60CD-4814 Dielectric Core Oven serves two high speed automatic core blowers, each filling ten plastic multi-cavity blow-in driers per minute, at The Schaible Company, Cincinnati, Ohio.

A COMPLETE RANGE OF TYPES AND SIZES . . .

for every core baking and mold drying requirement:

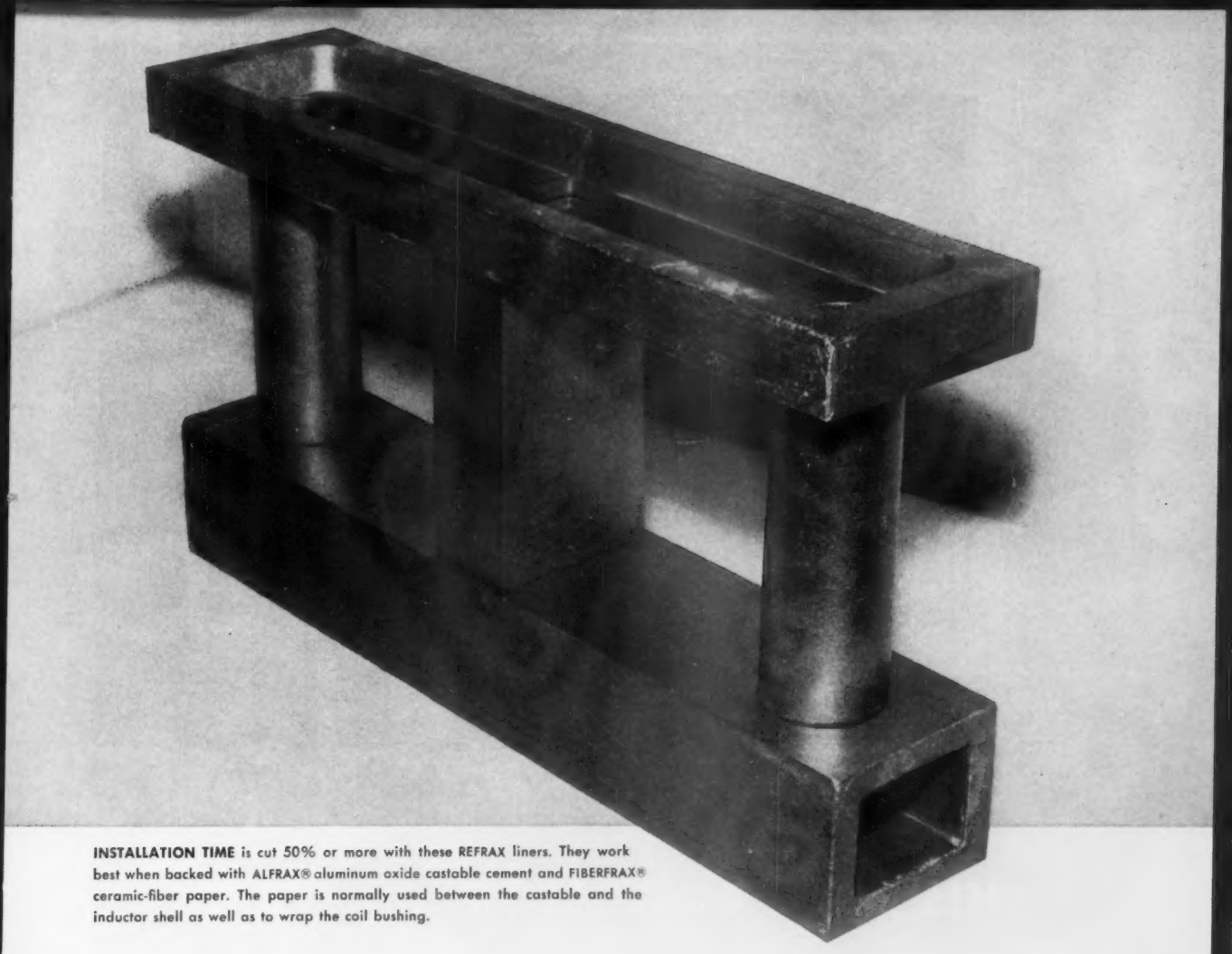
Tower Ovens • Horizontal Conveyor Ovens • Car-Type Core Ovens • Car-Type Mold Ovens • Transrack Ovens • Rolling Drawer Ovens • Portable Core Ovens • Portable Mold Dryers • Dielectric Core Ovens

THE FOUNDRY EQUIPMENT COMPANY

1821 COLUMBUS ROAD CLEVELAND 13, OHIO

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

MEMBER FEMA



INSTALLATION TIME is cut 50% or more with these REFRAX liners. They work best when backed with ALFRAX® aluminum oxide castable cement and FIBERFRAX® ceramic-fiber paper. The paper is normally used between the castable and the inductor shell as well as to wrap the coil bushing.

When Ajax-Tama-Wyatt inductor units melt aluminum, this

REFRAX® liner stops dross penetration

Here's a new channel lining for Ajax-Tama-Wyatt inductors that lasts longer than other materials . . . cuts cleaning and assembly time . . . reduces melting costs. It's REFRAX® silicon-nitride-bonded silicon carbide.

Dross can't penetrate and adhere to REFRAX liners because aluminum *can't wet* this refractory. Its smooth surfaces and low permeability stop metal penetration and build-up in the vertical and horizontal channels. As a result, the channels don't get progressively smaller and more difficult to clean —as they do with cast or rammed materials.

And the normal 8 or more hours it takes to ram a lining in an Ajax inductor has been sliced to 4 by using REFRAX channel liners (with ALFRAX® castable back-up cement).

REFRAX refractories can be formed into intricate parts—threaded, thin section, close tolerances—with outstanding corrosion resistance (even at temperatures well over 2,000 F). Consider, too, these properties: Tolerances of ± .005 in./in.; a modulus of rupture of 5600 psi at 2450 F (even the best heat resistant alloy melts below this temperature); and high heat conductivity that approaches that of chrome-nickel steel. Write today for further information about the outstanding properties of REFRAX refractories. Address Dept. C-38, Refractories Division, Carborundum Company, Perth Amboy, N. J.

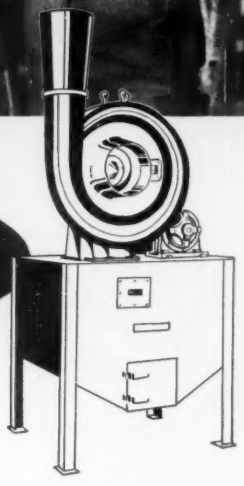
CARBORUNDUM

Registered Trade Mark

Circle 575 on Page 51

THIS DUST PRODUCER

meets its master in THIS DUST COLLECTOR



AAF Type D ROTO-CLONE takes the grime out of grinding!

Grinding dust is the favorite diet of AAF's dust-devouring dynamic precipitator, the Type D ROTO-CLONE. Whether the grinder is a swing frame, snag or portable, the dust meets the same fate—instant extinction. This means lower maintenance costs, better employee and community relations.

The Type D draws in the dust-laden air, delivers the collected material to the storage hopper, and expels the clean air—all in a single operation with only one moving part: the impeller. Exhauster and separator are combined in a compact, self-contained unit.

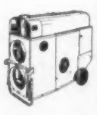
For complete product information on the Type D ROTO-CLONE, call your local AAF representative or write direct for Bulletin 272.

AAF herman nelson

American Air Filter
COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

Herman Nelson Portable Heaters



Illinois Heating Specialties

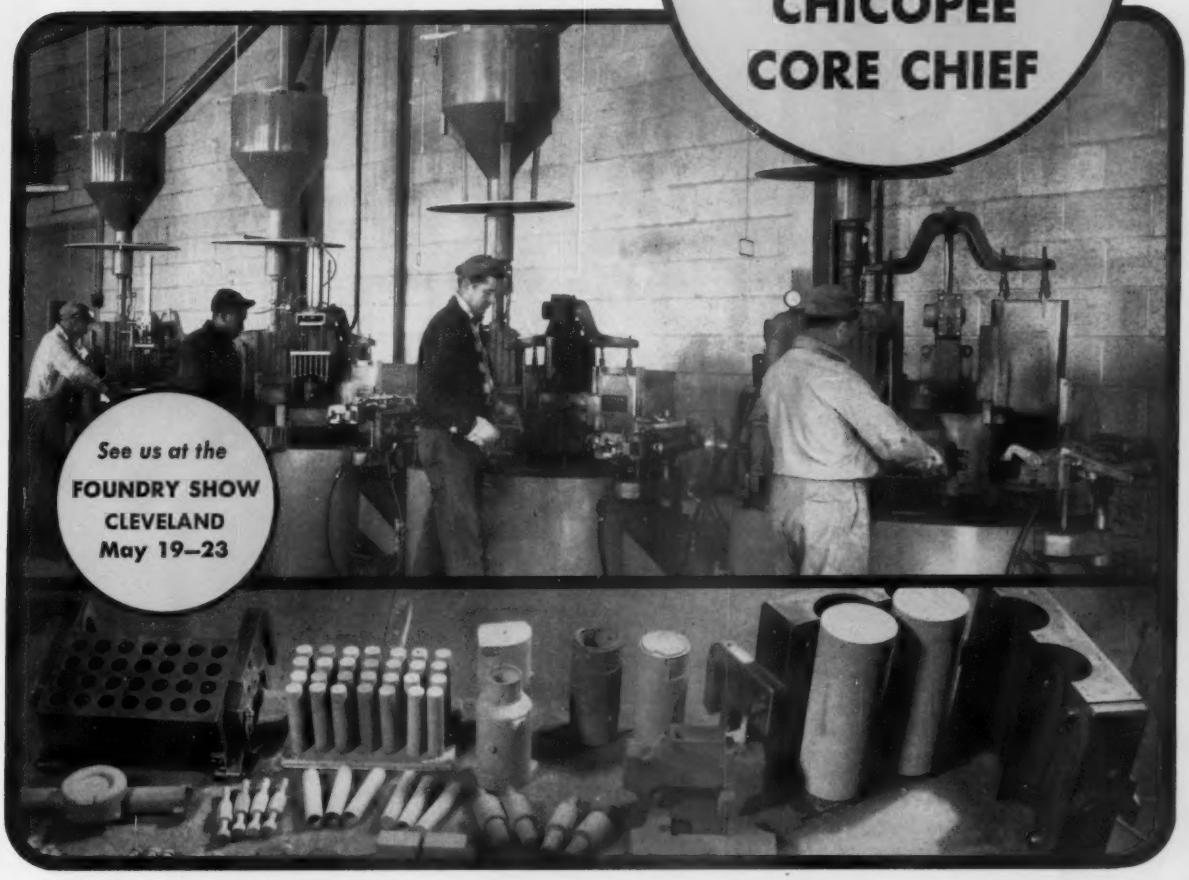
BETTER AIR IS OUR BUSINESS

AAF Electric Furnace Hoods

AAF Type K Exhauster

Have You Checked the Money-Saving Advantages of...

SHELL Core Blowing *with the* CHICOPEE CORE CHIEF



With the constant drive for better castings at less cost, many foundries have discovered the quickest way to immediately reduce costs and improve casting quality is in the Core Room.

This is accomplished by eliminating excessive core handling, costly driers and other old-fashioned equipment. With the installation of Shell Core Making Machinery you reduce core making costs up to 50% and more while improving casting quality. You owe it to yourself to investigate the money saving opportunities offered by the Chicopee Core Chief. Write for details.

WRITE TODAY
for free folder and additional information on shell core making with the Chicopee Core Chief.

SHELL PROCESS, INC.

Manufacturers of Shell Molding Machines and Allied Equipment

372 BLISS STREET • WEST SPRINGFIELD • MASS.

Circle 577 on Page 51

BAD BREAKDOWN becomes Lucky Break for STUDEBAKER

How auto manufacturer's 13th Simpson Mix-Muller turned trouble into tonnage on manifold line

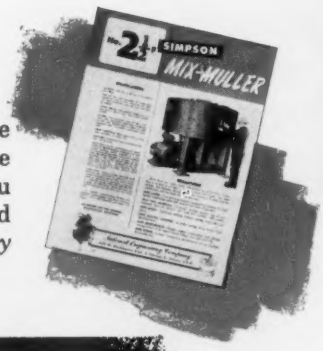
It was December 10, 1956. Studebaker-Packard Corporation was in full swing on their new models—when "old faithful" gave up the ghost. A 10-year old mixer used to prepare all molding sand on the manifold line had suffered a major breakdown. All of their other mixers were *Simpsons*—no chance of switching parts. Things were bad—30 days wait for repairs and the whole slinger line was down.

The fit was tight—$\frac{3}{8}$" clearance at one point; and delivery was a problem. But, *one week later* Studebaker Foundry took delivery on a new 2½F Simpson Mix-Muller.

Shortly thereafter the new Simpson was turning out *twice* the amount of sand per hour, per batch and per day. The slinger line was back in operation with more and *better* sand . . . to produce quality parts consistent with the Studebaker-Packard reputation.

What seemed to be a bad breakdown turned into a *lucky break* for Studebaker. Here's what else they got with the 2½F Simpson Mix-Muller that they didn't expect to buy:

- **Two times more sand with an $800 per year savings in horsepower (60 HP now—100 HP previous).**
- **Big batch capacity at slower speed meant that no special cooling devices were needed.**
- **Hot sand and loss of fines through cooling was eliminated.**
- **No major repairs to date and excellent plow life is reported.**
- **Lower sea coal costs.**
- **More positive moisture control.**

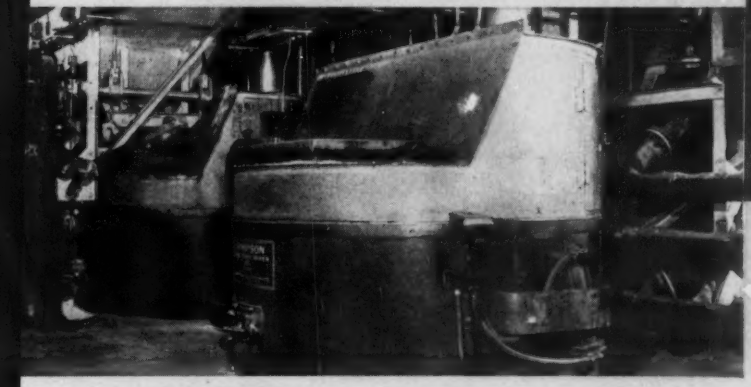


Why wait for YOUR next mixer breakdown? . . . to weigh the value of more and better sand against the doubtful economy of expensive and often hard-to-get, repairs. Let your NATIONAL agent show you modern mulling, in action . . . There's a Simpson Mix-Muller equipped shop near you and there's a Simpson Mix-Muller for your *every* foundry requirement.

Write for Specification Sheet on the 2½F Mix-Muller

2½F *SIMPSON MIX-MULLER* handles all molding sand requirements for Studebaker's manifold line at South Bend, Ind. foundry. Unit has: increased sand output, eliminated hot sand, slashed HP requirements and improved sand quality.

PHOTOS SHOW Mix-Muller shortly after installation. Temporary dust shield and undersize hopper will be replaced with dust tight hood, enclosing new full size National batch hoppers. Duct at right formerly exhausted hot air, condensates (and fines) to roof. Cooling is no longer necessary with the new Mix-Muller.



12 OTHER MIX-MULLERS serve Studebaker Foundry in all of their foundry operations.

NATIONAL ENGINEERING COMPANY

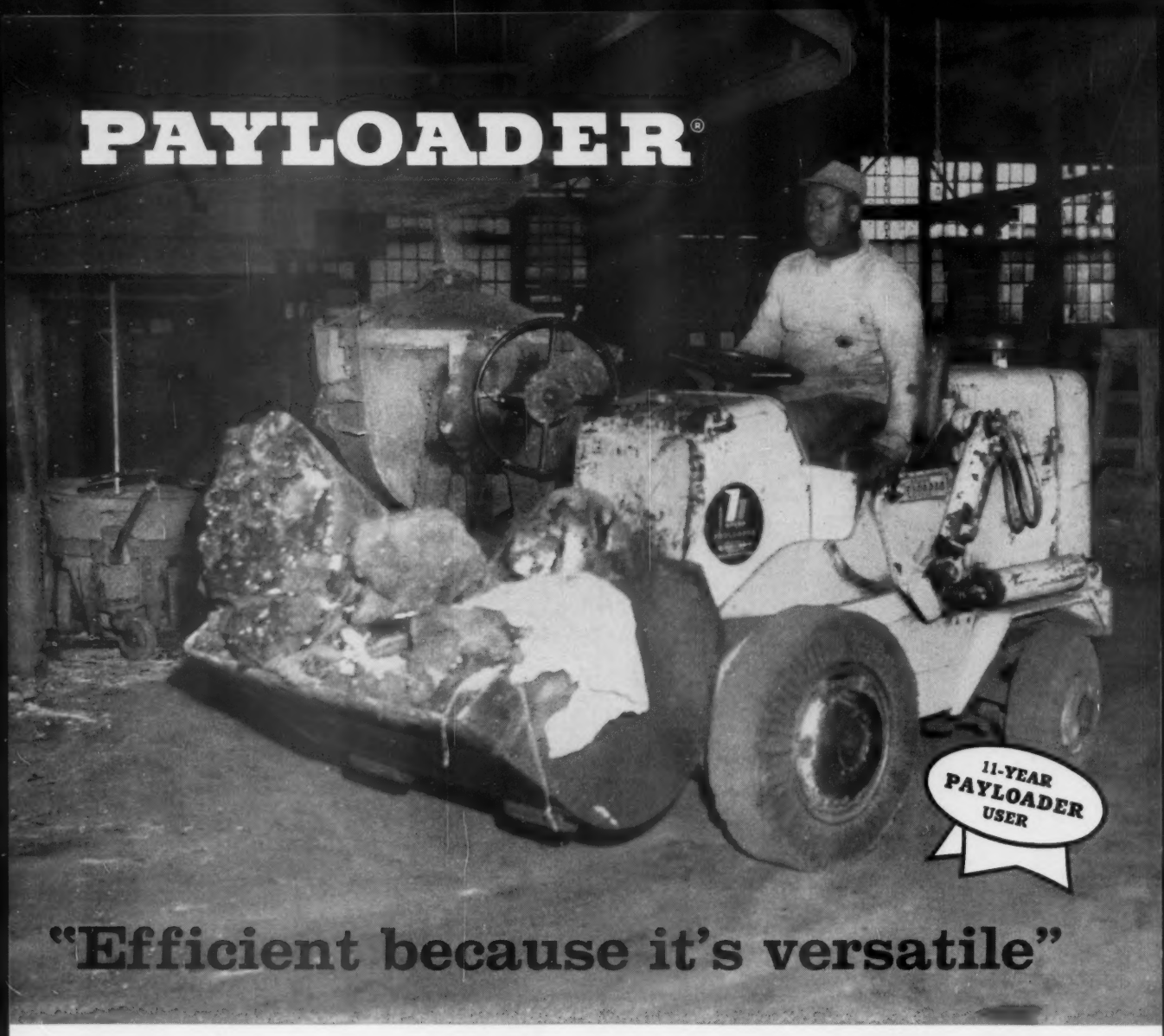
ANOTHER!
PROVEN PRODUCT OF THE PRACTICAL FOUNDRYMAN
BY **NATIONAL**

646 Machinery Hall Bldg. · Chicago 6, Illinois

Circle 578 on Page 51

F-258

PAYLOADER®



"Efficient because it's versatile"

Unloads all incoming sand, feeds molding stations, cleans up and loads out cupola slag and cleans up foundry floors at Richmond Foundry & Mfg. Co., Inc., Richmond, Va.

"Model HA 'PAYLOADER' tractor-shovels are efficient in our foundry operations because of their versatility alone," says Donald A. Matthieu of Richmond.

We have bought 4 since 1947 and have 3 in daily operation. They have proven very satisfactory and very economical, giving us ideal control of our sand-handling operations and every-day labor-saving."

Foundries of all kinds — big and little — gray iron, steel, malleable and non-ferrous have been joining the ranks of "PAYLOADER" users and boosters for 12 years. And today's Model HA "PAYLOADER" is a vast improvement over yesterday's — in productive capacity, digging ability, carrying capacity, carrying speed, in operator ease and safety and in lower maintenance.

Your Hough Distributor wants to demonstrate what a Model HA "PAYLOADER" can do in *your* foundry. Ask him about Hough Purchase and Lease Plans too.

THE FRANK G. HOUGH CO.
703 Sunnyside Ave., Libertyville, Ill.

Please send "PAYLOADER" information:
- ☐ Model HA (2,000 lbs. carry cap.)
- ☐ Model HAH (3,000 lbs. carry cap.)
- ☐ Attachments for scrap handling

Name.....

Title.....

Company.....

Street.....

City.....State.....

3-A-2

SAY "HUFF"

Modern Materials Handling Equipment

THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Circle 579 on Page 51

Late News

HEADS CASTINGS BRANCH: Morris E. Neeley Jr., sales manager, Dodge Steel Co., Philadelphia, is on leave for six months to serve as chief, Castings Branch, Business and Defense Services Administration, Department of Commerce. He has been with Dodge since 1942.

SPEAKERS: Dr. Ralph E. Lapp of Nuclear Science Services will be the principal speaker at the annual banquet of the American Foundrymen's Society Congress in Cleveland. His subject will be "Men, Rockets, and Atoms." The Charles Edgar Hoyt Memorial Lecture will be delivered by W. E. Remmers, Union Carbide Corp., who will discuss "Silicon and Its Ramifications." Both events are scheduled for Wednesday, May 21.

NEW LAB: Allis-Chalmers Mfg. Co. will build new engineering, development, and research laboratories in Greendale, Wis., about 2 miles from its West Allis works. The new facilities, to be situated on a 30-acre site, will employ a staff of 150 to 200.

FOUNDRY EXPANSION: Massey-Harris-Ferguson Ltd. plans a $1 million expansion program at its Brantford, Ont., foundry. It will enable the company to produce castings currently furnished by outside suppliers. New facilities will include a coreroom, equipment, an enlarged and redesigned cleaning room, and shipping facilities.

DUCTILE IRON: International Nickel Co.'s patent on ductile iron has been infringed by Ford Motor Co., it was stated in a recommendation filed at New York by the special master appointed in the litigation. This recommendation is subject to approval, rejection, or amendment by the judge assigned to the case.

NONFERROUS CASTING: Total shipments of nonferrous castings during 1957 shape up as follows: Copper, 875,195,000 lb; aluminum, 752,656,000 lb; zinc, 663,601,000 lb; and magnesium, 30,322,000 lb. Comparable 1956 totals were as follows: Copper, 966,306,000 lb; aluminum, 794,581,000 lb; zinc, 693,728,000 lb; and magnesium, 36,168,000 lb.

FREIGHT CARS: Deliveries of new freight cars to railroads totaled 7219 in January, compared with new orders for 401 cars in the same month. The backlog of cars on order and undelivered as of Feb. 1, was 48,787. A year ago, the backlog was 114,656 cars.

OBITUARY: Charles A. Breda, 79, formerly general superintendent, Allyne-Ryan Foundry Co., Cleveland, died Feb. 16 . . . Emil Mares, 65, former owner of Star Pattern Shop, Cleveland, died Feb. 16 in California, where he had made his home for the last 18 months . . . J. Reed Fidler, president and treasurer, Penn Iron Works Inc., Reading, Pa., died Jan. 26 . . . Joseph Nagusky, 86, former president, Federal Metal Co., Cleveland, died Feb. 9 . . . William F. Little, founder in 1908 of Little Bros., now known as Littite Foundries Inc., Port Huron, Mich., died Feb. 9.

MATERIAL HANDLING: Dollar volume of material handling equipment orders received during 1957 was 124.34 on the Material Handling Institute's index, which is based on 1954 orders as 100. This average for 1957 is 84.19 per cent of the business recorded in 1956. Fourth quarter 1957 bookings were 106.08 per cent of the same quarter in the base year, 1954. R. L. Fairbanks, vice president, Towmotor Corp., Cleveland, and president, MHI, predicts that material handling equipment dollar volume in 1958 will equal that of 1957 or show an increase of up to 5 per cent.

PERSONALS: Richard M. Ovestrud, recently chief metallurgist, Rhuda Media Co., Marble, Minn., has been made manager of research and development for Foundry Products Division, Reichhold Chemicals Inc., with headquarters at Elizabeth, N. J. . . . Theodore H. Harley

has been elected president, Vesuvius Crucible Co., Swissvale, Pa., succeeding Arthur J. Jackman, elected vice chairman of the board. . . . C. M. Capka, recently sales manager, Industrial Combustion Div., Eclipse Fuel Engineering Co., Rockford, Ill., has been appointed general sales manager, Despatch Oven Co., Minneapolis . . . Carter L. Burgess, former president, Trans World Airlines, has been elected president, American Machine & Foundry Co. . . . Arthur Neiman has been appointed Cleveland district manager for Sipi Metals Corp., Chicago . . . Arthur W. Kurz Jr. has been named manufacturing manager, Congress Die Casting Div. and Congress Drives Div., Tann Corp., Detroit . . . David T. Martin, former general sales manager, Central Foundry Div., General Motors Corp., Detroit, has become a member of the sales staff of Campbell, Wyant, & Cannon Foundry Co., Muskegon, Mich. . . . A. J. Mackan has been appointed Cleveland district sales manager for Federated Metals Div., American Smelting & Refining Co., New York . . . A. V. Lorch has been named marketing manager, pig and ingot, for Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif. W. J. Lawler succeeds Mr. Lorch as pig and ingot product manager in Chicago. He was operating superintendent at Kaiser's Trentwood, Wash., rolling mill.

MISCELLANY: Biggs Boiler Works Co., Akron, Ohio, has been acquired as a wholly owned subsidiary by Union Spring & Mfg. Co., New Kensington, Pa., and will be operated as the Biggs Steel Foundry & Fabricating Co. . . . Johns-Manville Corp., New York, has started a year-long observance of its 100th anniversary. J-M's annual sales currently are around the $300 million mark . . . An agreement to merge Summers Gyroscope Co., Santa Monica, Calif., with Mercast Corp., Los Angeles, has been approved by the boards of both companies. The merged company will be known as the Summers Corp. . . . Harsco Corp., Harrisburg, Pa., has contracted for construction of a 135,000-sq-ft plant at Springfield, Tenn., which will produce diecastings and pressed steel automotive components. The plant will be operated by Ainsworth-Precision Castings Co., a Harsco division . . . Ross-Meehan Foundries Inc., Chattanooga, Tenn., will install new equipment this year at an estimated cost of $150,000. Largest item scheduled in the expansion program is an induction furnace and related equipment.

Prices of Foundry Metals and Coke

(As of Feb. 24, 1958)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$18.00-18.50
OVEN	
Birmingham	$28.85
Buffalo	30.50
Detroit	30.50
Erie, Pa.	30.50
Indianapolis	29.75
Kearny, N. J.	29.75
Milwaukee	30.50
Montreal, Que.	31.00
Neville Island (Pittsburgh)	29.25
New England, deld.	31.55
Painesville, O.	30.50
Philadelphia	29.50
St. Louis	31.50
St. Paul	29.75
Swedeland, Pa.	29.50
Terre Haute, Ind.	29.75

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$68.50	$69.00
Birmingham	62.50	66.50
Buffalo	66.50	67.00
Chester, Pa.	67.00	67.50
Chicago	66.50	66.50
Cleveland	66.50	66.50
Duluth	66.50	66.50
Erie, Pa.	66.50	66.50
Everett, Mass.	68.00	68.50
Fontana, Calif.	75.50	....
Geneva, Utah	66.50	....
Granite City, Ill.	68.40	68.90
Neville Island (Pittsburgh)	66.50	66.50
Swedeland, Pa.	68.50	69.00
Toledo, O.	66.50	66.50
Troy, N. Y.	68.50	69.00
Youngstown, O.	....	66.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 25.75; tin bronze, No. 225, 34.50; No. 245, 29.25; High-leaded tin bronze, No. 305, 29.75; No. 1 yellow, No. 405, 21.25; manganese bronze, No. 421, 23.00.

ALUMINUM: 99 per cent plus primary ingots 28.10. Secondary No. 12 alloy, 21.00-21.75. Deoxidizing grades: No. 1, 23.00; No. 4, 18.00.

MAGNESIUM: 99.8 per cent notched ingots 36.00, f.o.b. Velasco, Tex. (10,000 lb or more).

COPPER: Electrolytic 25.00, delivered Connecticut valley.

ZINC: High grade 11.35 delivered. Die casting alloy No. 3, 14.25; No. 2, 15.25, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$31.00-32.00	$50.00-51.00	.....	.....	.....	.....	$49.00-50.00
Boston*	**30.00	**29.00-30.00	.....	.....	**35.00-36.00	.....	.....
Buffalo	28.00-29.00	**39.00-40.00	.....	.....	**44.00-45.00	.....	46.00-47.00
Chicago	39.00-40.00	41.00-42.00	.....	46.00-47.00	46.00-47.00	54.00-55.00	54.00-56.00
Cincinnati*	**29.00-30.00	**38.00-39.00	**33.00-34.00	.....	**47.00-48.00	.....	**54.00-55.00
Cleveland	33.00-34.00	44.00-45.00	36.00-37.00	45.00-46.00	48.00-49.00	60.00-61.00	57.00-59.00
Detroit*	**29.00-30.00	**29.00-30.00	**24.00-25.00	**33.00-34.00	.....	**32.00	.....
Los Angeles	32.00	**38.00	.....	.....	.....	.....	.....
New York*	34.00-36.00	34.00-35.00	32.00-33.00	.....	.....	.....	.....
Philadelphia	38.50	38.00	40.00	.....	49.00	58.00	58.00-60.00
Pittsburgh	34.00-35.00	40.00-41.00	.....	42.00-43.00	49.00-50.00	.....	56.00-58.00
St. Louis*	33.00	43.00	32.00	44.00	.....	.....	51.00
San Francisco	32.00	40.00	28.00	40.00	40.00	.....	.....
Seattle	28.00	31.00	28.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point.

For Cleaner Surfaces, Better Shakeout, Try WHITEHEAD'S NEW HYGEIA LYQUAFLOUR

Our new plant at Irwin, Pa., is producing the improved DUSTLESS DOUBLE STRENGTH HYGEIA LYQUAFLOUR. The compound of a special hydrocarbon and woodflour improves castings and mold conditions for all types of metal. Highly recommended for the advantages listed below:

- One sand additive controls both peel and expansion
- Good shakeout saves sand
- Imparts highest flowability to sand mixture to give pattern true finish
- 2% initial treatment of sand and as little as ¼ of 1% to reactivate does the job
- Replaces any carbon or hydrocarbon materials now used
- Eliminates dust at the muller
- Castings peel excellently which reduces cleaning room time
- Reduces penetration and burn-on
- Overcomes sand expansion defects, maintains good compression strength
- Improves molding, "feel", and "moldability"
- No rigid control required
- Permits hard ramming
- Less ramming required, more molds per hour
- Less temper water needed

Whitehead Brothers COMPANY

Established 1841

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence, R. I.

Manufacturers of

LYQUAGRIP
Ready-to-use core paste

DUO RESIN
Binder for baking with controlled oven temperatures

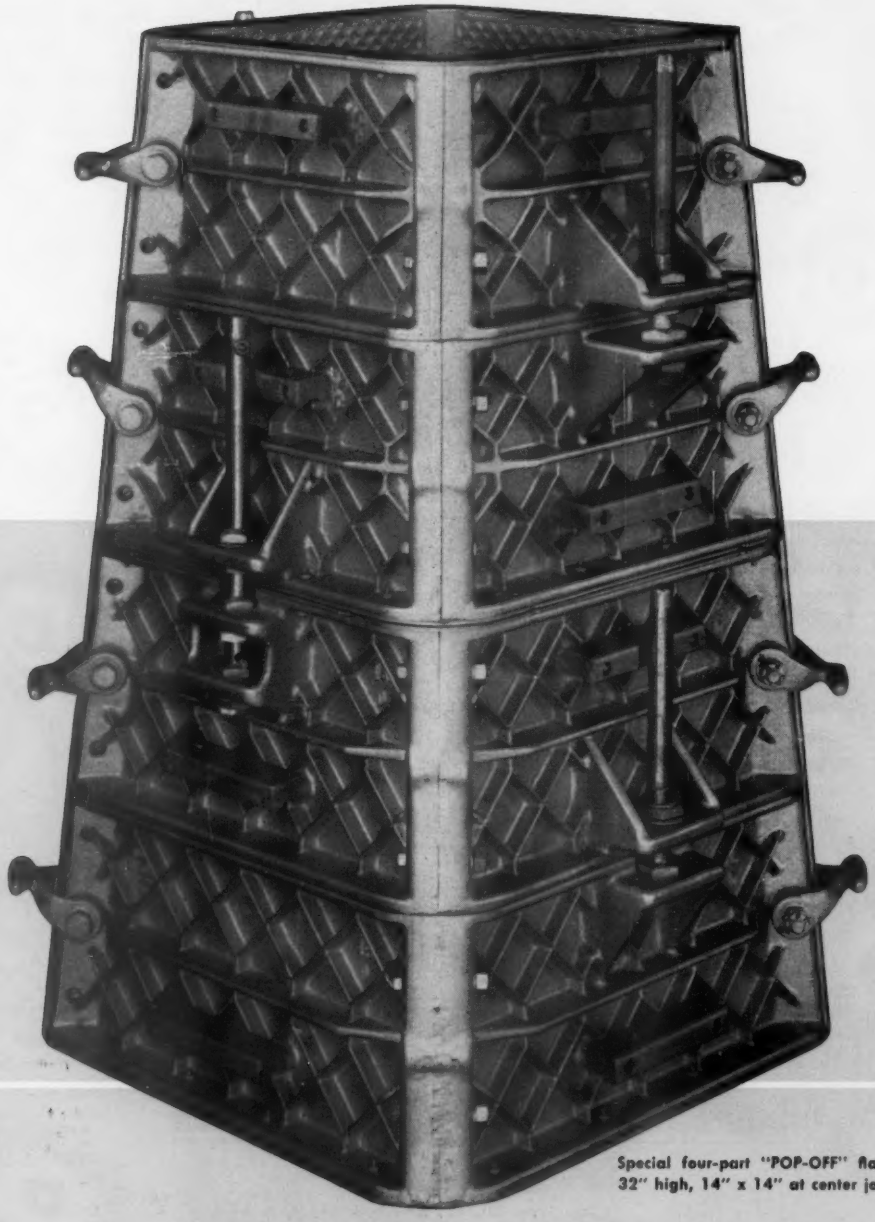
JOINT SEAL
Plastic compound for perfect sealing

LYQUAFACE
The liquid sand grain coating

DOB-IT
Ready-to-use core mudding compound

Circle 580 on Page 51

when you need FLASKS



Special four-part "POP-OFF" flask, 32" high, 14" x 14" at center joint

...you're better off with "POP-OFF"

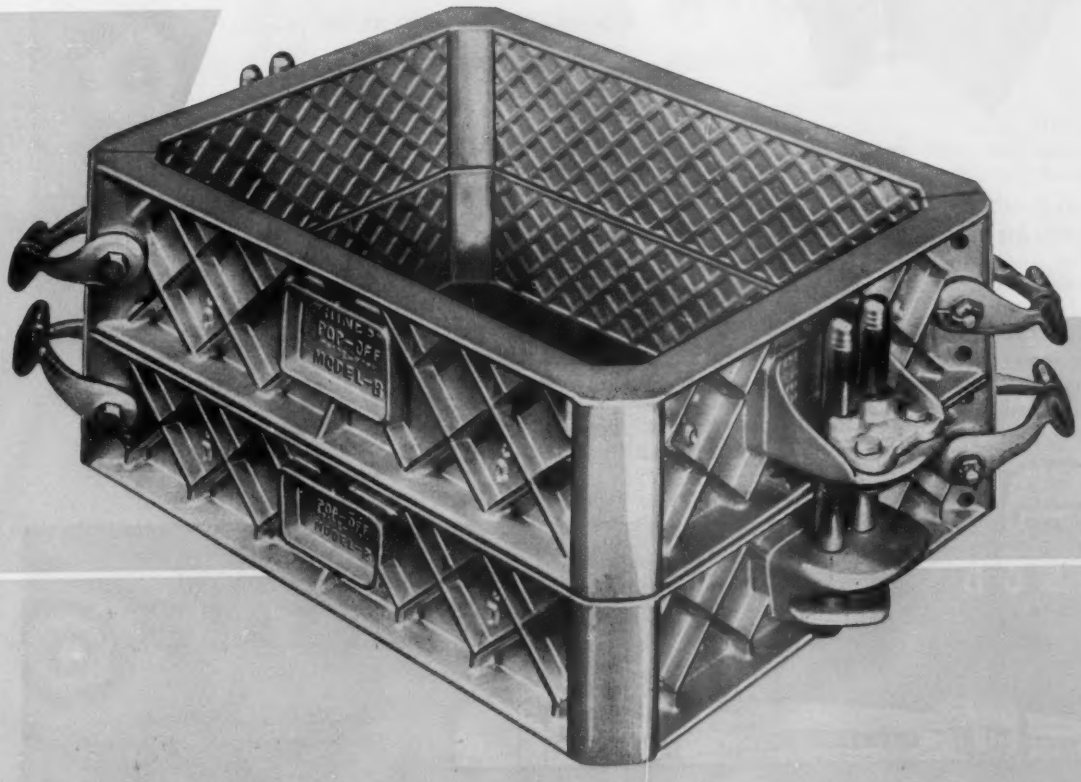
HINES FLASKS

HINES POP-OFF FLASK

THE HINES FLASK CO.

3431 WEST 140th STREET
CLEVELAND 11, OHIO

Standard aluminum "POP-OFF" flask, light in weight, extremely durable



Circle 581 on Page 51

CESCO

the Complete Line that's years ahead in safety, style, and comfort!

Plastic and Metal Frame Glasses

These new open-type safety glasses give your workers all the features they want most . . . smart styling plus on-the-job utility. Long-wearing plastic and metal frame makes them an economical safety equipment choice because lenses can be replaced separately. All-in-one plastic section does double duty as lens rim and Comfort Bridge pad. Provides full closure at nose section and is unaffected by skin oils and cleaning agents.

In 2 Sizes • **46 x 39mm (No. 326)**
48 x 41mm (No. 328)

Shape of Lens • **F-7 in clear and anti-glare safety glass and clear Cescolite plastic**

4 Bridge Sizes • **20, 22, 24 and 26 mm**

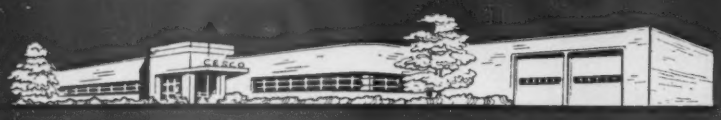
***ASK** your distributor to show you his complete line of CESCO head and eye protective equipment. There's a CESCO distributor located in most major cities coast-to-coast.*

Plastic and Metal Frame Glasses with Side Shields

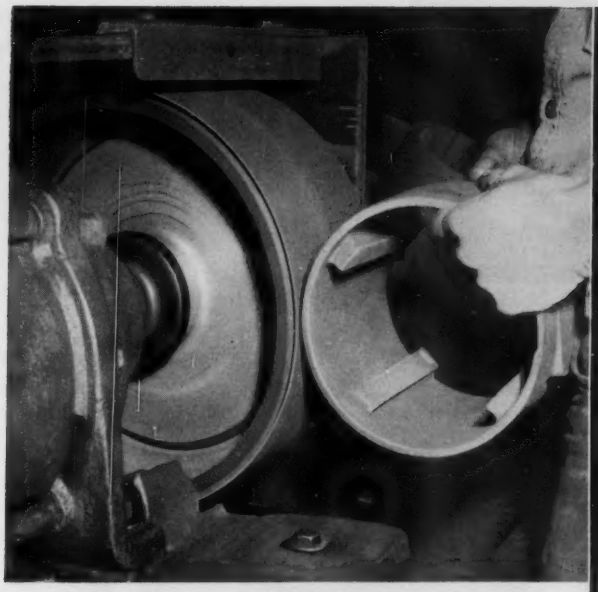
The **No. 336** plastic and metal frame glasses offer the same outstanding features as the glasses described above plus wire mesh side shields. Available in 2 sizes: 46 x 39mm and 48 x 41mm.

CESCO

CESCO FOR SAFETY

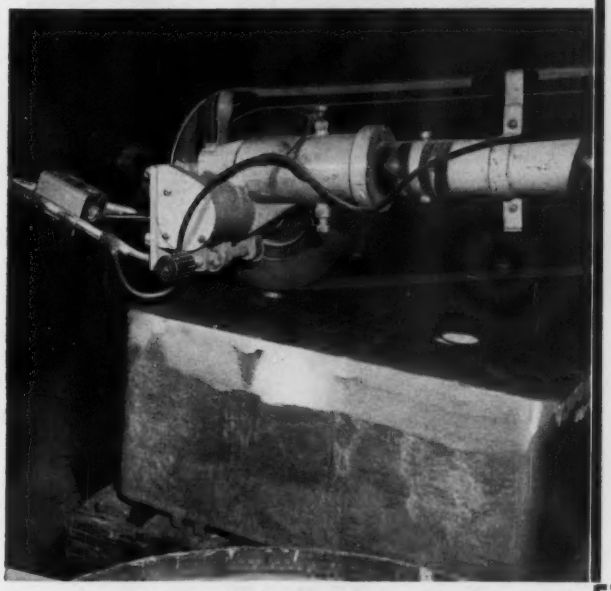


CHICAGO EYE SHIELD COMPANY
2721 West Roscoe Street, Chicago 18, Illinois



California foundry uses a 3M Coated Abrasive belt to remove parting lines on steel electric motor frames. Belts replaced hard wheels, provide a vastly superior finish.

Connecticut foundry finds 3M Coated Abrasive discs ideal for removing flash from cast aluminum potato peelers. Disc gives an excellent finish—blends area *fast*.



Eastern non-ferrous foundry uses 3M Coated Abrasive belts to cut rises from aluminum traffic signal control boxes. Belts helped increase production 50% over the old method.

Cut foundry costs . . . boost production with 3M Coated Abrasives

Here's the *modern* method for putting a quality finish on your castings. 3M Coated Abrasives—belts or discs—are engineered to give you better, faster finishing at lower unit costs. Regardless of your method of casting—sand, shell, die or CO_2—these modern grinding and finishing tools will do an outstanding job for you, help you increase production, cut costs.

Find out how 3M Coated Abrasives can go to work in *your* foundry. Call your 3M Representative *today* or send coupon below.

Send today for FREE Booklets

Minnesota Mining and Manufacturing Co.
Dept. CN-38, St. Paul 6, Minn.

- ☐ Send me free booklet: "The 3M Method of Belt Grinding and Finishing"
- ☐ Send me free booklet: "Grinding and Finishing Nonferrous Metals with 3M Abrasives"
- ☐ Please have a 3M Representative call

Name_____ Title_____

Company_____

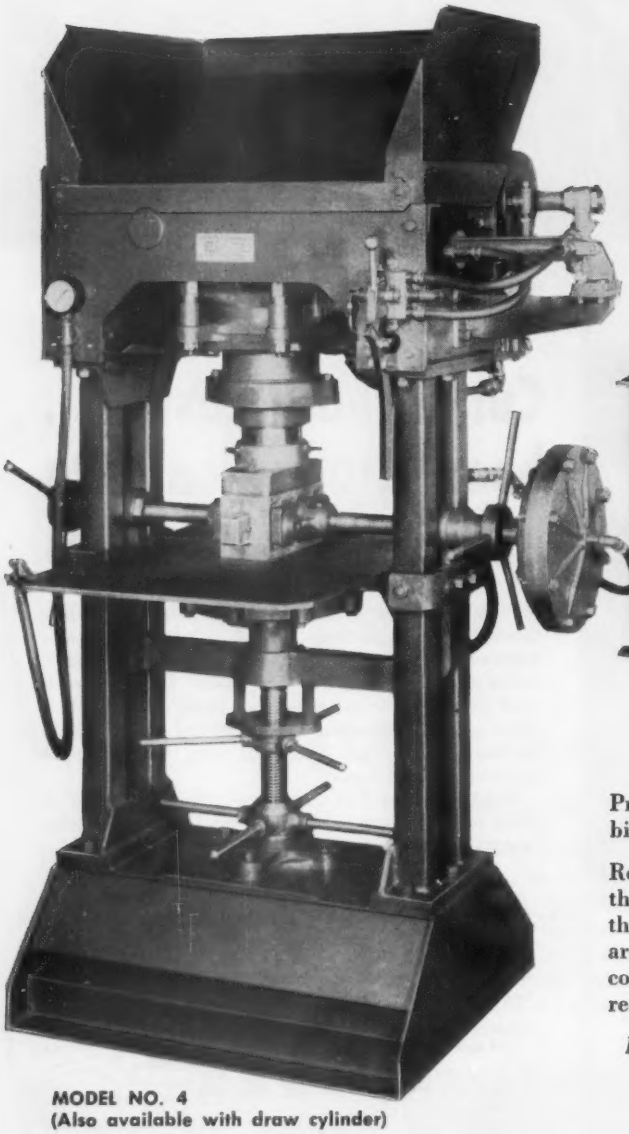
Address_____

City_____ Zone_____ State_____

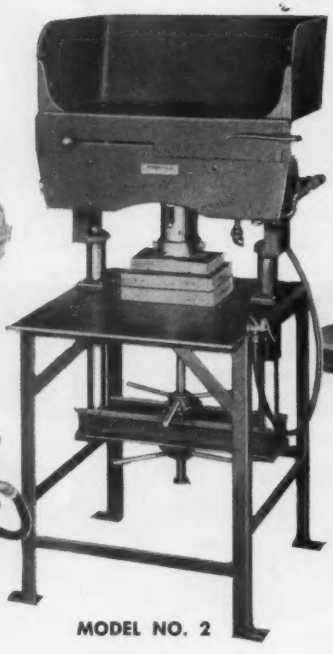
3M ABRASIVES

Made in U.S.A. by MINNESOTA MINING AND MFG. CO. General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Ave., N.Y. City.

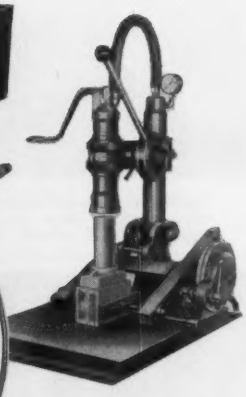
Redford CORE BLOWERS



MODEL NO. 4
(Also available with draw cylinder)



MODEL NO. 2



BENCH TYPE

Proven performance — simplicity — flexibility — power — speed.

Redfords are keeping pace with progress in the foundry. From the first bench type to the new No. 4 . . . all Redford Core Blowers are designed to meet your demand for better cores at lower cost, regardless of production requirements.

For complete information, write for our detailed literature.

Redford IRON & EQUIPMENT CO.

20733 GLENDALE AVENUE • DETROIT 23, MICHIGAN • PHONE: KENWOOD 1-8611

Foundrymen Prefer

NATIONAL* Western BENTONITE

because . . .

1. It comes from the highest quality bentonite deposits in the world—with the largest reserves to assure uniform and continuing quality.
2. The high quality of the material plus the vast research facilities assure compliance with all Western Bentonite specifications.
3. The quality of material, reserves, and continuous technical research from the most modern foundry laboratories are backed by service from trained, experienced foundry engineers available at any time to work on your foundry problems.

National Western Bentonite is available from better foundry dealers everywhere.

BAROID DIVISION • NATIONAL LEAD COMPANY

332 South Michigan Avenue, Chicago 4, Illinois

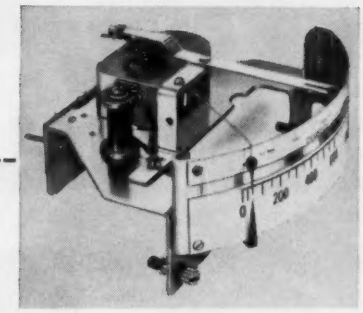
*Trademark Registered U.S. Patent Office

BAROID

B 5831

***Pyr-O-Vane* Millivoltmeter Controller**

Available in 150 standard ranges, and a variety of control actions. Both vertical and horizontal models can be flush or surface mounted.

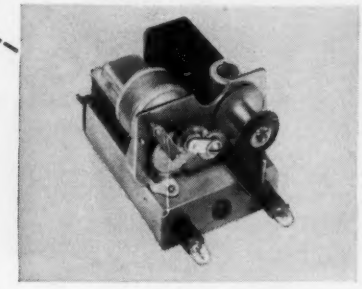


Plug-in galvanometer unit ▲

High-strength *Alnico* magnet makes possible larger gap between magnet and core, reducing clogging due to dirt and dust. Triple ambient temperature compensation provided.

Plug-in pulse *Pyr-O-Vane* control unit

Control units available with choice of 10 different control forms. Proportional band adjustable between 1 and 3%; cycle timing change gears available for 3, *7.5*, 12, 18, 30 or 72 seconds. ▼



For economical temperature control

A COMPLETE LINE OF BROWN MILLIVOLTMETERS

CAREFUL attention to design and construction details makes Brown Millivoltmeters accurate—and rugged enough to *stay* accurate in hard use. They give reliable, low-cost temperature control for any heat-using process that doesn't require a chart record.

True plug-in design makes maintenance easy. You can change galvanometers and control units in *less than a minute.*

Choose Brown Millivoltmeters from 150 standard ranges and scales . . . for any safety or control application. And you can have a choice of either horizontal or vertical cases.

With Honeywell's complete line, there's no need to shop around for your various millivoltmeter accessories . . . from thermocouples and *Radiamatic* detectors to motorized valves and dampers.

Your nearby Honeywell field engineer will be glad to discuss your specific needs. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Products Group*, Brown Instruments, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

H HONEYWELL *First in Controls*

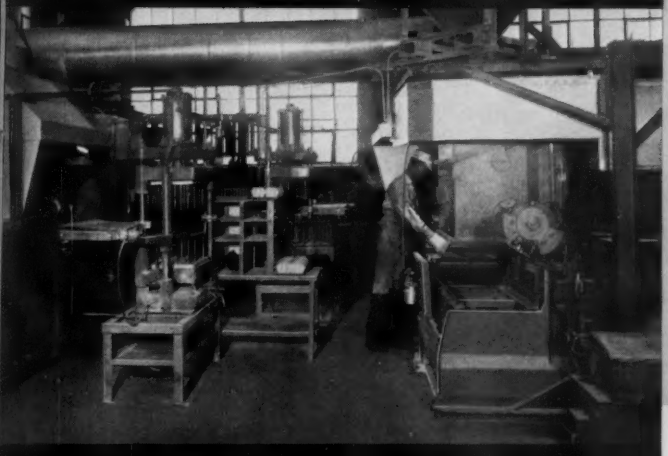
Circle 586 on Page 51

Circle 587 on Page 51→

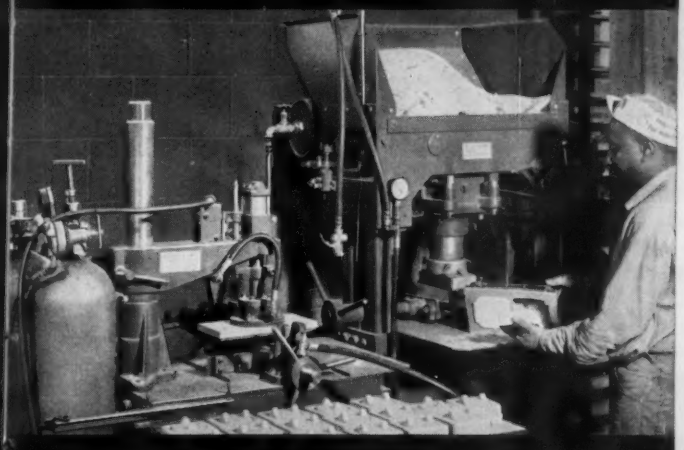
COMPLETE SHELL FACILITIES

at your service . . .

MOLDS—Newest production methods, latest equipment combine to produce high precision, low cost shells on quantity basis.



CORES—Automatic, economical CO_2 shell core-making facilities round out an efficient "mold-a-minute" precision production team.



CASTINGS—Close tolerance, smooth finish, non-ferrous shell-type castings are poured from metal melted in high frequency induction furnaces.

For fast service, fine dimensional accuracy and low over-all cost on small and medium size non-ferrous castings, look to City Pattern Foundry & Machine Company. Here you'll find, too, all the additional facilities . . . a complete, modern pattern shop, foundry, metallurgical laboratory and machine shop . . . that are required to provide an *all inclusive* service on top quality shell process castings.

City Pattern Foundry & Machine Company's experience in the shell process dates back ten years. As a result, here are shell facilities you can count on for all your jobbing needs. We'll be delighted to discuss your needs with you in detail. Why not call or write today.

CITY PATTERN

FOUNDRY AND MACHINE CO.

1161 HARPER AVENUE • DETROIT 11, MICH.

PHONE: TRinity 4-2000

Empty weight on rear axle
9,020 lbs.

4-wheel-drive, rear-wheel
power-steer

Full power-shift in all speeds
plus forward and reverse

Empty weight on front axle
6,660 lbs.

Total weight—15,680 lbs.

11,000 lbs. break-out force

5,500 lbs. carrying capacity

Powerful high-torque Case gasoline or diesel engine, equipped with power-boosting torque-converter drive, gives the Case W-9 Terra-load'r up to *40,000 lbs.** of crowding power for fast digging in hard materials. Direct thrust design utilizes full power and prying action of machine for maximum digging efficiency. Operator always has clear view of bucket.

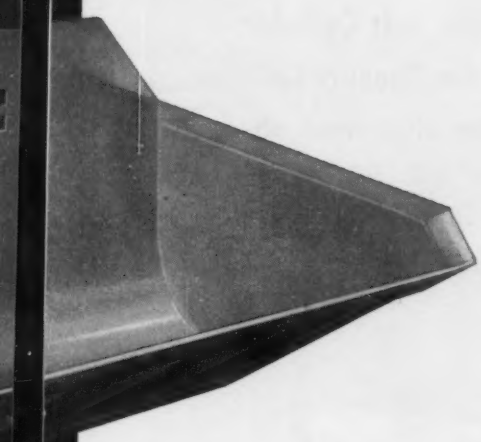
*Assuming adequate traction

40° bucket rollback, combined with properly balanced weight distribution, enables the Case W-9 to carry bigger payloads at higher speeds — with less spillage — and without the usual "bounce and forward-dip" experienced with conventional rubber-tired loaders. Full power steering on rear wheels makes unit extremely easy to turn and maneuver.

Short, rigid lift-arms, pivoted *ahead* of the operator, provide 62½" of forward reach for pitching loads into center of truck. This exclusive feature also gives operator unobstructed visibility on both sides . . . eliminates danger of catching operator's arm in lifting mechanism . . . makes it easy to get on or off machine any time, without climbing over boom arms.

NEW CASE W-9 TERRALOAD'R

revolutionizes loader performance on rubber ...saves you up to $2000 in first cost!



Here, at last, is a big capacity *4-wheel drive, rear-wheel-steer* loader that gives you all the advanced performance features you've been wanting in this type of unit — at savings *up to $2000 in first cost.* With the new W-9 Terraload'r you get . . .

Better balance and stability — Improved weight distribution, with 37% more empty weight on rear wheels, provides better traction for tough digging, without "bucking", or raising rear wheels off ground. This, together with better lateral stability, enables you to dig, maneuver and dump heaping payloads faster, easier, more safely.

Improved operator safety — Operator has unobstructed visibility in all directions . . . can get on or off machine in a hurry. And all boom-lifting mechanisms are completely out of the way!

Power matched to the job — High-torque Case gasoline engine (or famous all-weather-starting Case diesel), with torque-converter drive, insures adequate power for all digging and loading operations — with *maximum* fuel economy, dependability and long life.

Constant-mesh power-shift transmission — Provides three forward and reverse speed ranges — from 0 to 21 MPH — automatically balanced to changing loads, with full power-shift on-the-go in all speed ranges, as well as forward and reverse. Two conveniently located levers — one for speed selection, one for forward and reverse — give instant, positive control without mechanical shifting.

One warranty, one service source — Complete machine — *including the engine* — is engineered, built and fully warranted by J. I. Case Company, and serviced by reliable Case Industrial Dealers everywhere. No costly delays on parts! No "split-responsibility" on service!

Investigate today — Call or write your nearest Case Industrial Dealer for full information, including details of new Case financing and LEASE plans to fit your needs, without tying up needed working capital.

3 Bucket Sizes

1¾ cu. yd.—for tough digging
1¼ cu. yd.—for std. materials
2¾ cu. yd.—for light materials

Clip...mail for free literature

J. I. CASE COMPANY
Dept. C1558, Racine, Wis., U.S.A.

☐ Send free catalog on new W-9 Terraload'r
☐ Send name of nearest Case Industrial Dealer

Name ..... Title.....
Employed by .....
Address .....
City ..... State.....
C-TL-139

Big 42.5 GPM hydraulic pump teams with husky double-acting lift and bucket-tilt cylinders to give the Case W-9 Terraload'r a terrific break-out force of 11,000 lbs. at ground level. Carrying capacity in travel position is 5,500 lbs. All-weather cab (shown in above illustration), together with heater and other deluxe accessories, are optional at extra cost.

Wide, flat-bottom Case bucket gets heaped loads fast . . . raises to full lift-height in 7½ seconds. Automatic sight-leveling gauge on right bucket tilt-cylinder tells bucket-angle at a glance, enables operator to adjust bucket to ground level position while lowering. Transmission is automatically disengaged by touching brake, for max. hydraulic power.

CASE

1st in quality for over 100 years

Circle 588 on Page 51

Fast Delivery!

INTERNATIONAL
TYPE LJS
JOLT SQUEEZERS

- Portable or Stationary
- 4" dia. Jolt Cylinder
- 10" dia. Squeeze Cylinder
- 5" dia. Jolt Cylinder
- 12" dia. Squeeze Cylinder
- Platen alignment always accurate and quickly adjustable
- Poppet Type Valves

The "Behemoth" of Jolt Squeezers

Low Maintenance Cost

Machine Sold Complete with

1. Vibrator
2. Match Plate Holder
3. Pop Valve
4. Air Gauge
5. Riddle Rest
6. Cleaner Valve
7. Automatic Lubrication
8. Sprue Cutter Holder

Long-lasting because of Sturdy Construction - extra heavy weight

INTERNATIONAL MOLDING MACHINE CO.

LA GRANGE PARK, ILLINOIS • (Suburb of Chicago)

NATIONAL MOLDER'S HELPER

It's an "Elevayor"

This unique National-patented equipment item will deliver a full mixer batch from discharge door to bin within 20-30 seconds. Can be designed to receive charge from front end loader too. Shoveling or extra handling is *completely* eliminated.

Use it with any Mix-Muller

You've already cut your costs if you're now a Mix-Muller user! Molder's Helper can be used with any Model Mix-Muller (1F to 2½F)

Molder's Helper with 1½F Mix-Muller handles 1000 lb. batch. Is equipped with two 50 cu. ft. hoppers.

It's an aerator!

Upper section of "Elevayor" automatically aerates sand. Another step eliminated, another item of equipment and labor that's *built-in* with this low cost mechanized National "package" unit.

It's overhead sand

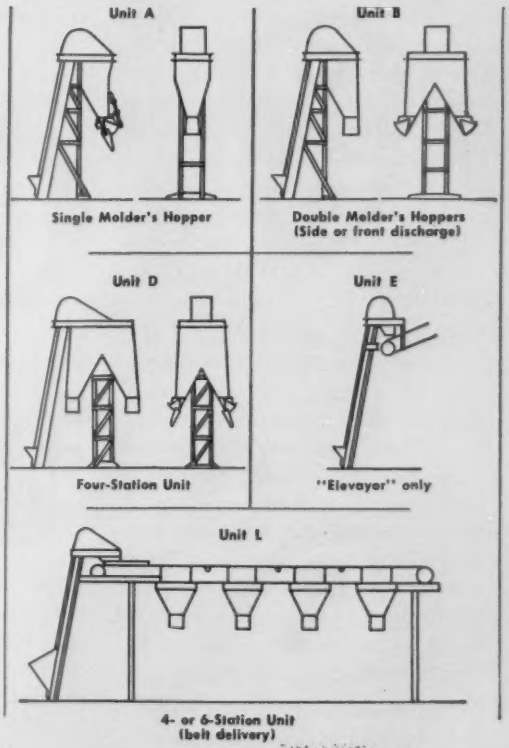
Sturdy, NATIONAL Molder's Hoppers receive fluffy, aerated free-flowing sand ready for molding — in seconds. Units available for 2, 4 or 6 molders stations. Riddling and shoveling are eliminated to cut molder's time up to 50%.

It's National Quality

The Molder's Helper is a *foundry* proven item. Its design, fabrication and performance characteristics reflect the same quality of workmanship that is found in all National-engineered components.

Many arrangements possible

Other arrangements available to suit specific requirements.



Now any foundry can afford to have overhead sand!

The National Molder's Helper is designed to eliminate the costly time and labor consuming job of hauling sand from mixer to molder. With it, you can bring overhead sand to the smallest operation; *increase* molders production up to 50%; *eliminate* floor shoveling and *concentrate* your entire mixing and molding operation into no more floor space than one molder now occupies.

Cold hard *dollars* saved in increased efficiency, lower labor costs and better, more flowable sand—can quickly pay the small cost of the Molder's Helper. *But what's more* any foundry with a Simpson Mix-Muller already has a head start in equipment. Write for further details today, or let your man from NATIONAL give you an estimate.

NATIONAL ENGINEERING COMPANY

646 Machinery Hall Bldg.
Chicago 6, Illinois

Circle 590 on Page 51

ANOTHER!
PROVEN PRODUCT OF THE PRACTICAL FOUNDRYMAN
BY **NATIONAL**

(Advertisement)

International Minerals & Chemicals

A REPORT TO FOUNDRIES

There's Romance in the Foundry!

An attractive southern lady, who is also a president and general manager of a foundry south of the Mason-Dixon line, recently said there was a lot of romance in the foundry industry. If you are romantically minded, you will read this with interest.

Millions of years ago, a now extinct volcanic mountain range known as The Cordellians spewed forth huge quantities of ash and lava into a giant inland sea. An earthquake or several earthquakes caused the bottom of the sea to move up, bringing with it layer upon layer of this ash. Through millions of years, these humps weathered and eroded away to form mountain ranges. People now dig into these mountain ranges and come up with a rather amazing product.

This product will plug a leak in a dam, and is used as an essential ingredient in ladies' make-up cream both for their charming faces and lovely legs. It is valuable in tooth paste, shoe polish, sheep dip, and it relieves soreness of horses' hoofs. It purifies sewage, and is the best possible filler for nitroglycerin dynamite. It keeps bread fresh and is basic to the dyeing of clothes. It is used by laundries for washing clothes and by the automobile industry in paints.

Your breakfast fruit juice is probably clarified with it as was the vinegar on the salad last night and the motor oil in your car. Sounds fantastic, doesn't it? Yet this remarkable stuff is also an essential ingredient in crayons, pencils, insulation, dry cells, water softeners, rubber and latex products and, among other things, it is used as a laxative ingredient.

So, you might be very much surprised to know that some of this versatile material can be found right in your own warehouse. We hope the name on the bags says *Black Hills Western Bentonite.* That's right! This amazing material is known as western bentonite and is used to provide high green strength combined with maximum dry strength.

Most steel foundrymen might shudder at the idea of using southern bentonite because of their requirements for high hot and dry strengths. However, Dixie Bond is being used in steel with outstanding success. It has real advantages when used properly.

The really unusual application of Dixie Bond in steel is in the backing sand.

This has found wide use in foundries that are running 100% new sand facings or are reclaiming their sands for facings.

In these cases, the western bentonite (preferably Black Hills, of course) combined with cereal, dextrin, and other typical steel additives provides the proper hot strength and dry strength in the facing. Dixie Bond is introduced into the backing sand. The backing sand has maximum flowability and minimum retained strength. The result is that the foundryman is able to ram his mold harder and at the same time, has much easier shake-out.

This is one of the many uses of Dixie Bond described in our Dixie Bond literature. Don't hesitate to write to us when you are looking for facts about bond clays.

Foundries operating heaps instead of mechanized sand systems always face a problem of rebonding without getting too much segregation or clay balls. We have found that Dixie Bond is the ideal clay for this type of thing, not only because it gives the highest possible green strength, but also because it cuts into the heap with a minimum of mulling.

Dixie Bond is unique in its ability to provide strength with conditions usually found in a heap operation. It is still true that the highest efficiencies are obtained from mulling but the bond gives good results with any type of mixing. As a result, this type of rebond may be put on the idle floor and mixed with a sand cutter or similar machine or even by hand shoveling.

Many foundries, in which the ratio of sand-iron is so low that additions are made only periodically, will

use a concentrate made up of new sand, plus Dixie Bond. This concentrate will be mulled to develop maximum efficiency and then will be cut into the sand as a new sand to maintain the strengths. If you are interested in this type of operation, we have a complete description in the publication entitled, "The Use of Dixie Bond in Heap Sand." It is yours for the asking.

TECHNICAL SERVICE

R. E. CLELAND
Sales Manager
Northern District

There's hardly a foundryman in Michigan, in parts of Ohio, Pennsylvania, New York and in Quebec and Ontario provinces in Canada who doesn't know well the name of Cleland.

First there was Sam. Sam Cleland, the grand old man who represented Eastern Clay for more years than he may like to remember and who knew thousands of foundrymen by their front names.

Sam retired in 1953 and now his son Bob is covering the same territory as Sales Manager of the Northern District.

Bob worked and trained with his father for 16 years (with 3 years out for army service, being discharged as a Captain). Bob learned his job the hard way . . . for who could be a tougher taskmaster than a father? So you'll understand why today Bob Cleland is so highly regarded by foundrymen in his territory. Why they depend on him so heavily for his advice and practical help on technical foundry operating problems.

We at IMC are justly proud of our sales staff, confident in their technical competence, sure of their ability and willingness to serve foundries well. Bob Cleland is ably carrying on the great tradition of Eastern Clay service.

SAGGING IN CORES

Peculiarly enough, green strength is not a complete measure of the green properties of oil sand core mixes. Frequently, the inability of a core to sit or fit into its prints is due to a slight sagging while the core is green or during the early part of the baking cycle before the oil or resin is set.

Sagging is controlled to a reasonable extent by carefully made dryers in production shops or by the proper wiring and rodding for intricate cores or larger shapes. A great deal can be done with the sand itself by the proper introduction of Dixie Bond.

We still have reprints of a paper "Core Sag Controlled" which we offer on our usual free basis. This article describes the effect of Dixie Bond and points out why so many foundries have gone to the additions of a .25% to .35% Dixie in their mixes. There are complete details on the green strength, permeability, tensile strength, hardness, blowability, and above all, sag resistance. There is adequate proof of the underlying reasons behind the conclusions drawn.

Green core impact tester measures sagging resistance of a 2 x 2 in. core.

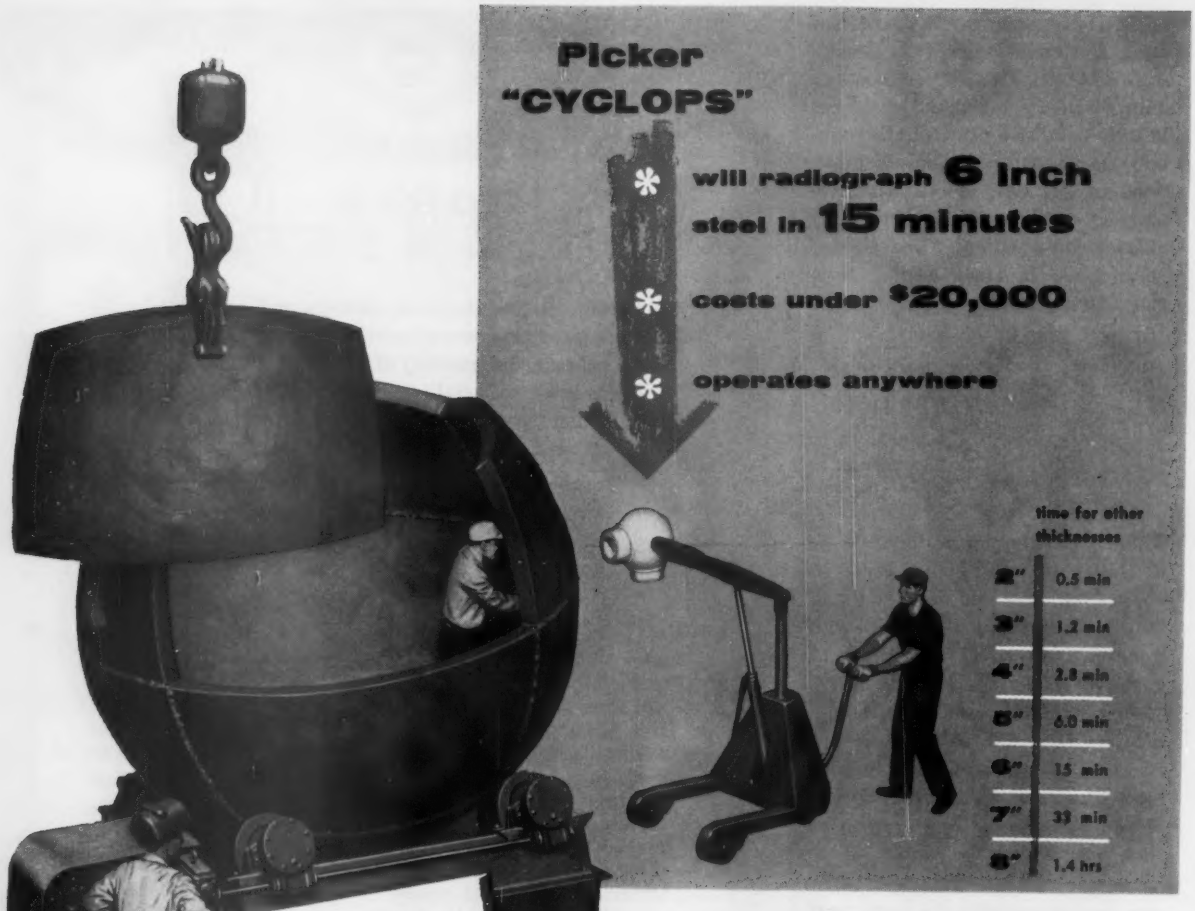
"The use of Dixie Bond in the core room is now established practice. Its principal function is to control the impact properties of green cores. This property of Dixie Bond has resulted in 1) reduction in number of cores scrapped for sag and distortion, 2) the reduction in broken cores, 3) reduction in number of wires required per core, and 4) in rare cases, the elimination of core dryers.

Impact tester measures oil-sand core resistance to cracking and spreading.

"On the basis of these tests, the optimum percentage of southern bentonite for most applications is 0.30%. For maximum resistance to impact, no other change is made in the core mixture. The other properties are changed as follows: 1) green compression strength increases, 2) permeability increases, 3) flowability remains essentially constant, 4) stickiness decreases, 5) baked tensile strength decreases, 6) hardness remains constant."

EASTERN CLAY PRODUCTS DEPT.
INTERNATIONAL MINERALS & CHEMICAL CORPORATION
20 NORTH WACKER DRIVE, CHICAGO 6 • PHONE: Financial 6-1800

Circle 591 on Page 51



quick rundown on CYCLOPS

excellent detail sensitivity
1% and 2% radiographic sensitivity is routine

high energy
Cyclops holds a 1000 rhm source of Cobalt 60: its radiation is equivalent to 2-3 million volt x-rays

low first cost
Capital investment is under $20,000—less than one-quarter the cost of an equivalent supervoltage x-ray installation

low operating cost
No electronic or x-ray tubes: virtually no maintenance

self-contained mobility
Travels anywhere . . . easy to use even in the open at a construction site

completely safe
Engineered for safe operation under all conditions

Wheel "Cyclops" into action like this—then walk away. Start exposure electrically from a remote, fully protected position. *Come back in fifteen minutes and find the job done.*

Cyclops is a "natural" for radiographing massive castings and weldments of steel, dense alloys, even solid lead inches thick.

Whatever the nature of your need for radiographic or fluoroscopic inspection, we probably have just the machine to do the job for you. The Picker spread of equipment spans the range from 10 KV x-rays (for paper-thin materials) to 2-3 MEV equivalent Cobalt 60 units.

For information and advice concerning any phase of radiation-utilization, contact any Picker District office (see local 'phone book). Or write, telephone or wire Picker X-Ray Corporation, 25 South Broadway, White Plains, N. Y.

If it has to do with radiation it has to do with Picker x-ray

Circle 592 on Page 51

Reader Information Service

FOUNDRY

Use these cards for more information on anything advertised in this issue, or for extra copies of editorial articles. Don't overlook additional cards on page 167 for more information on items described in the Foundry Equipment and Supplies Digest section in this issue.

FURTHER INFORMATION on Advertised Products ?

March 1958

SIMPLY CIRCLE AD ITEM NUMBER BELOW

521	536	551	566	581	596	611	626
522	537	552	567	582	597	612	627
523	538	553	568	583	598	613	628
524	539	554	569	584	599	614	629
525	540	555	570	585	600	615	630
526	541	556	571	586	601	616	631
527	542	557	572	587	602	617	632
528	543	558	573	588	603	618	633
529	544	559	574	589	604	619	634
530	545	560	575	590	605	620	635
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533	548	563	578	593	608	623	638
534	549	564	579	594	609	624	639
535	550	565	580	595	610	625	640
641	656	671	686	701	716	731	746
642	657	672	687	702	717	732	747
643	658	673	688	703	718	733	748
644	659	674	689	704	719	734	749
645	660	675	690	705	720	735	750
646	661	676	691	706	721	736	751
647	662	677	692	707	722	737	752
648	663	678	693	708	723	738	753
649	664	679	694	709	724	739	754
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654	669	684	699	714	729	744	759
655	670	685	700	715	730	745	760
761	776	791	806	821	836	851	866
762	777	792	807	822	837	852	867
763	778	793	808	823	838	853	868
764	779	794	809	824	839	854	869
765	780	795	810	825	840	855	870
766	781	796	811	826	841	856	871
767	782	797	812	827	842	857	872
768	783	798	813	828	843	858	873
769	784	799	814	829	844	859	874
770	785	800	815	830	845	860	875
771	786	801	816	831	846	861	876
772	787	802	817	832	847	862	877
773	788	803	818	833	848	863	878
774	789	804	819	834	849	864	879
775	790	805	820	835	850	865	880

EXTRA COPIES OF ARTICLES ?

FILL IN PAGE NUMBER AND TITLE OF ARTICLES DESIRED

Page No.	Title of Article
.....	.....
.....	.....
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PRODUCT MANUFACTURED .....

FURTHER INFORMATION on Advertised Products ?

March 1958

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525	540	555	570	585	600	615	630
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535	550	565	580	595	610	625	640
641	656	671	686	701	716	731	746
642	657	672	687	702	717	732	747
643	658	673	688	703	718	733	748
644	659	674	689	704	719	734	749
645	660	675	690	705	720	735	750
646	661	676	691	706	721	736	751
647	662	677	692	707	722	737	752
648	663	678	693	708	723	738	753
649	664	679	694	709	724	739	754
650	665	680	695	710	725	740	755
651	666	681	696	711	726	741	756
652	667	682	697	712	727	742	757
653	668	683	698	713	728	743	758
654	669	684	699	714	729	744	759
655	670	685	700	715	730	745	760
761	776	791	806	821	836	851	866
762	777	792	807	822	837	852	867
763	778	793	808	823	838	853	868
764	779	794	809	824	839	854	869
765	780	795	810	825	840	855	870
766	781	796	811	826	841	856	871
767	782	797	812	827	842	857	872
768	783	798	813	828	843	858	873
769	784	799	814	829	844	859	874
770	785	800	815	830	845	860	875
771	786	801	816	831	846	861	876
772	787	802	817	832	847	862	877
773	788	803	818	833	848	863	878
774	789	804	819	834	849	864	879
775	790	805	820	835	850	865	880

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FOUNDRY

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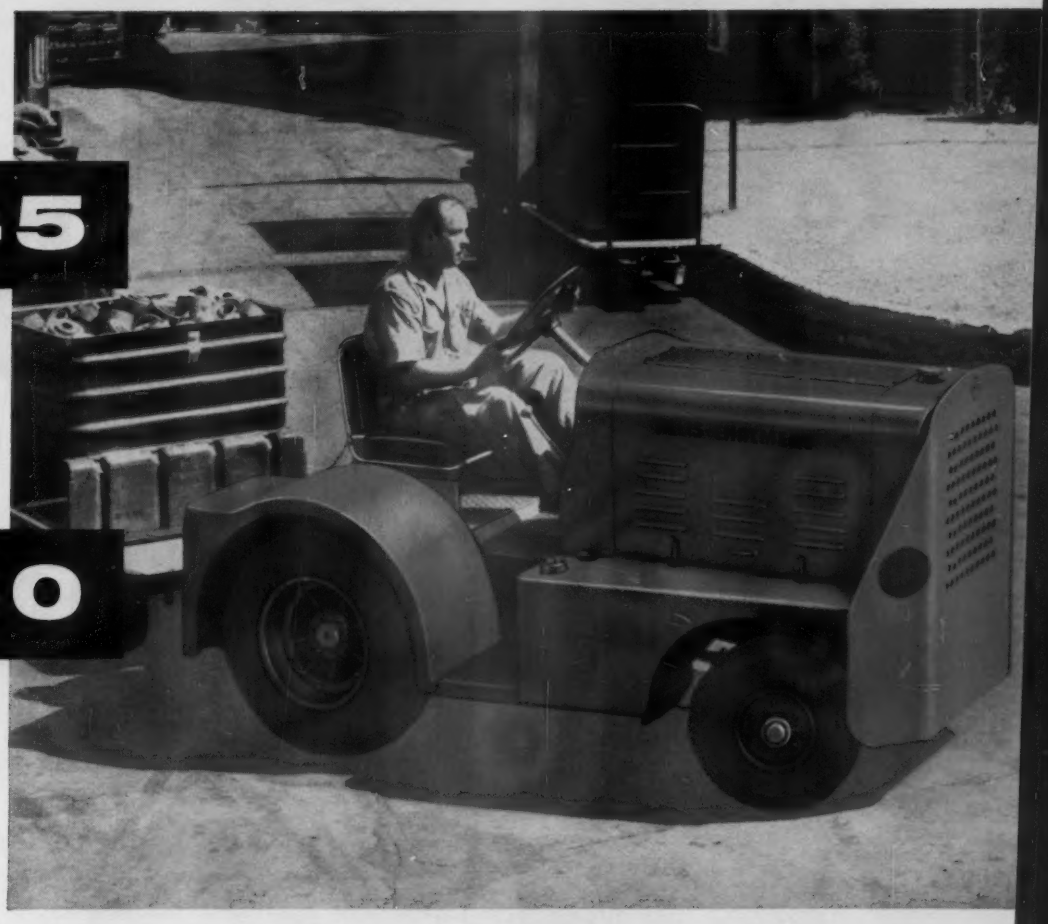
NEW Allis-Chalmers Towing Tractors

TG-45

4,500 lb drawbar pull
Tows 90 tons

TG-50

5,000 lb drawbar pull
Tows 100 tons



Bring you EXTRA-OUTPUT advantages –

New low silhouette — You work freely, even where there is low clearance.

Maneuverability — You wheel around sharp turns, in and out of tight corners.

Torque converter drive gives you smooth breakaway power, extra pull for steep grades or tough going.

Heavy-duty *Do-More Power* — Allis-Chalmers *industrial* engine gives you *Do-More Power*, with tough "hang-on" torque.

They're extra-rugged with industrial-type, reinforced, welded steel frame, heavy-duty differential, extra-strong shafts and gears, tough drive axle.

Flexibility — A wide selection of optional equipment makes these tractors real handymen on all sorts of jobs.

Easy, safe driving — Driver gets on or off either side. Floor board is clear — no levers to trip over. Visibility is unobstructed. There are two brakes for maximum safety: big-area hydraulic service brake and mechanical parking brake.

Get the complete story on the new TG-45 and TG-50 industrial towing tractors. See your Allis-Chalmers material handling dealer—write direct for Bulletin BU-337A.

Allis-Chalmers, Engine - Material Handling Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

BH-66

Circle 593 on Page 51

WHERE DO NEW IDEAS COME FROM? . . .

ideas that stand the test of time spring from the minds of men with the courage to lead — to pioneer in thought — to try the untried.

It was an idea such as these . . . a revolutionary new product . . . that brought Wheelabrator Corporation into being fifty years ago. And the intervening years record a steady procession of other successful developments . . . *firsts* in their field.

This pioneering, inventive spirit has permeated the organization since the early days of its founding. It is the heart of Wheelabrator's business philosophy . . . the reason for its growth and leadership.

Preserving this proud tradition is a constant challenge and a never-ending responsibility of the entire Wheelabrator family of pioneers.

they come from WHEELABRATOR®

In airless blast cleaning, the *new* ideas of today come from the originator of the process itself — Wheelabrator Corporation. Since its invention twenty-five years ago, the Wheelabrator has opened up a vast world of uses in many fields. Its history is one of challenges met and needs fulfilled.

In the steel industry, for example, Wheelabrator's preeminence stems from more than a decade of pioneering leadership . . . in developing the *first* machines and methods for utilizing the airless blast process for finishing mill rolls and descaling sheet and strip, slabs and billets, structural shapes, wire rod and bar stock.

Added to these accomplishments is the fact that Wheelabrator's background includes the most varied and extensive experience, by far, from the standpoint of successfully operating installations . . . 132 machines in 103 plants.

Sensing problems . . . finding practical ways to solve them . . . pursuing the policy of progress through creative engineering . . . that's why the new ideas in blast cleaning come from Wheelabrator. And a good policy it is — for the next fifty years, too.

WHEELABRATOR corporation

505 S. Byrkit Street Mishawaka, Indiana

Canadian Offices: Scarborough (Toronto) Montreal

World's largest manufacturers of airless blast equipment and steel abrasives.

Circle 594 on Page 51

NEWAYGO PLANNING and ENGINEERING SERVICE

by specialists in Foundry Equipment

The Newaygo Engineering Company emphasizes engineering in practice as well as name. A complete staff of foundry engineers, experienced in layout, design and installation is at the service of our customers at all times.

These engineers have a reputation as specialists in the foundry field. Their average time with Newaygo is 12 years per man, and their experience covers every phase of foundry operation and equipment . . . sand handling, mold handling, mold making and allied equipment and operations . . . manual, mechanized or automated. In the last 12 months our staff has completed three automated lines for different foundries.

Newaygo engineers are backed by the most modern engineering department and working facilities available. The testimonials that best dignify their successes are the many unsolicited letters received from foundries using Newaygo engineered equipment. From planning through installation — small jobs to those costing over $600,000.00 — these foundries tell us that Newaygo engineering and service is as reliable as Newaygo equipment is efficient.

These testimonials are on file and open to your inspection. They point up the reasons why foundries rely on Newaygo for efficient, low cost sand handling:

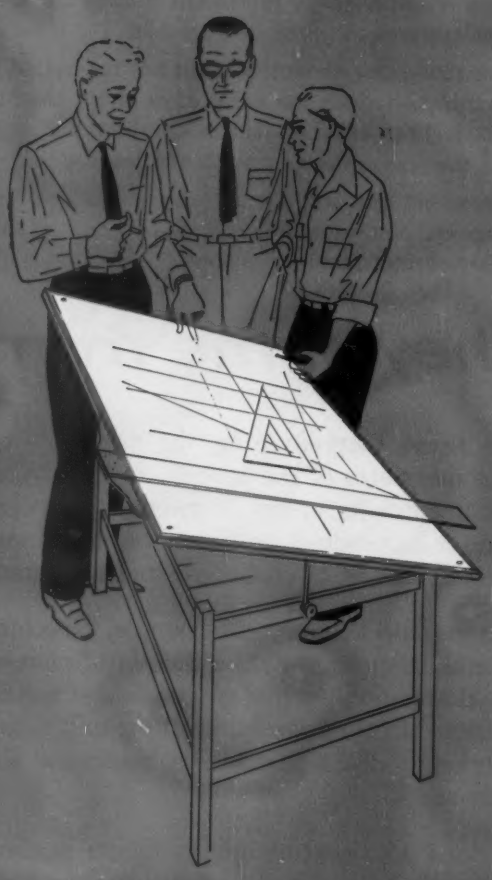
Engineering layouts, estimates and service by practical engineers.

Single contract efficiency with one company responsible for engineering, fabrication and erection.

A complete staff of service engineers on 24 hour call.

An honest reputation for meeting delivery commitments.

A 45 year record of proven ability.



Reports from foundries with installations of Newaygo Equipment show an average increased production of 60%, ranging from 20% to a high of 300%. Man hours saved average 44%, ranging from 13% to 80%. That's an engineering record that's hard to beat.

NEWAYGO *engineering company*

NEWAYGO, MICHIGAN

NEW LOOK at Drake foundry. Durez-bonded shells are poured horizontally. Then bedding sand is thrown over the poured shells and another layer is started.

"Tough—but worth it!" says small foundry taking the big step to shell mold castings

Can a progressive small foundry compete with larger ones in the production of shell mold castings?

"Yes!" says the management of Drake Manufacturing Co., Inc., Friendship, N. Y.

Drake, with about 50 employees, was producing 250 tons/month of production and semi-production gray iron castings. In shell molding, Drake managers saw an opportunity to broaden services, boost plant output 40%.

Help—from a customer

Drake men went to see a customer—a company buying production castings requiring close accuracy (±1/64" on many dimensions, .040" finishes on most surfaces, and pressure tightness). The castings were to be machined in a highly automated line.

The customer listened as Drake men explained why shell mold castings would increase his machine production by reducing material removal, and give him more uniform castings.

Then he wrote an order for pattern equipment plus a substantial number of castings.

It took about four months, including pattern-making time, for Drake to get into full production of shell mold castings. Initial progress was not smooth. Drake management spent hundreds of hours on the new process. Many tests were run again and again before definite conclusions could be reached.

Help from Durez, too

Through the changeover period, an experienced Durez man was on the job, too. He checked trial castings; adjusted sand-resin ratios; made useful recommendations based on Durez know-how in foundry resins.

Drake men agree their effort is paying off now—in dimensional accuracy of castings, fine surface finish, and low cost over long runs.

Less manpower per mold

An outstanding advantage of shell molding, Drake discovered, is the semi-skilled labor cost. Skilled labor is used only on the pattern—not on the molding floor. Lower costs per mold result.

Semi-skilled operators can make the molds. Nearly one-third of the cores produced at Drake come from two new machines operated by one man *without previous foundry experience.*

Only a few months after first deciding to look at shell molding, Drake management sums up:

"We are pleased with the shell operation at our plant—and most important is the satisfaction of our customers with the castings."

In this successful venture, Drake depends exclusively on Durez foundry resins. You can get results like Drake's, too—accuracy, good surface finish, low cost—when you choose Durez for *your* shell molding resin requirements.

To learn how foundries are using these resins, and to get an idea of the results they enjoy, write us today asking to receive issues of fact-filled "Durez Shell Molding News."

DUREZ® HOOKER CHEMICALS PLASTICS

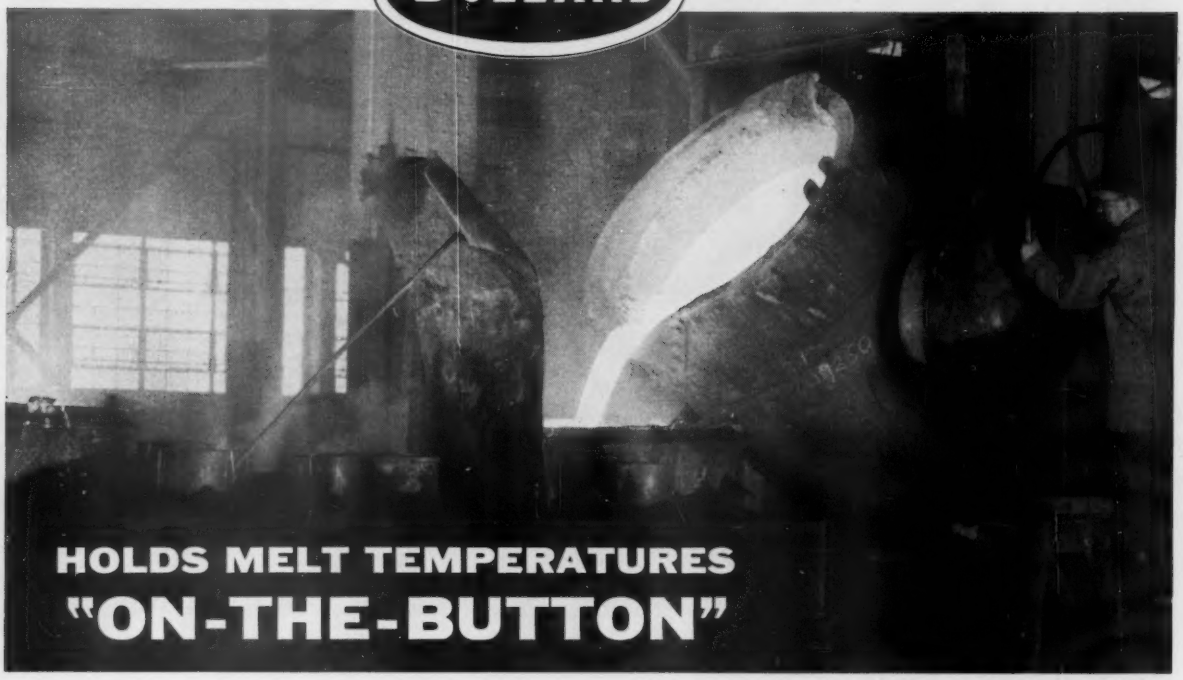
PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY

1003 Walck Road • North Tonawanda, N. Y.

Circle 596 on Page 51

Ultra-modern BULLARD foundry



HOLDS MELT TEMPERATURES "ON-THE-BUTTON"

▲To get the best possible machine tool castings, The Bullard Company uses Foxboro Air Weight Control in their new 7-million dollar foundry. Ladle is pouring a 29,000-lb. casting.

...with Foxboro Air Weight Control

At the new multi-million-dollar Bullard Company foundry in Bridgeport, Conn., Foxboro Air Weight Controllers automatically help produce top quality castings for world-famous machine tools.

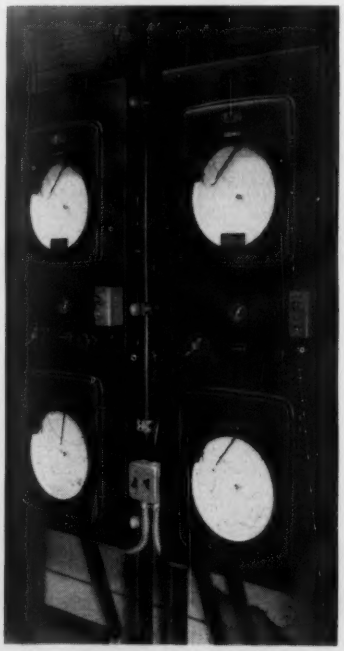
"We set them in the morning and forget them", says Stanley H. Bullard, foundry superintendent. "And they hold the set point all day — right on the button."

Foxboro Air Weight Controllers meter blast by *weight of air* instead of volume. They help cut fuel costs . . . practically eliminate pigging . . . provide accurate chart records of the melt. Variations in temperature, barometric pressure, cupola resistance, and line voltage are compensated automatically.

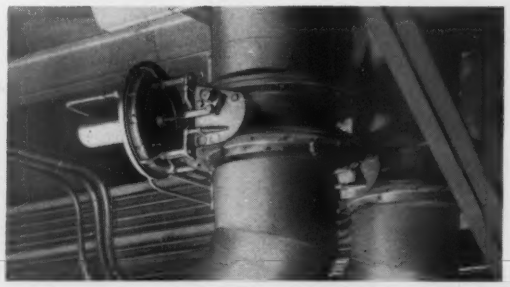
Foxboro Air Weight Controllers have been foundry-proved in over 1700 installations. See what they can do for you by writing for Bulletin 10-10, or by asking your nearby Foxboro Field Engineer. **The Foxboro Company, 323 Neponset Ave., Foxboro, Mass., U. S. A.**

FOXBORO AIR WEIGHT CONTROL

REG. U.S. PAT OFF.

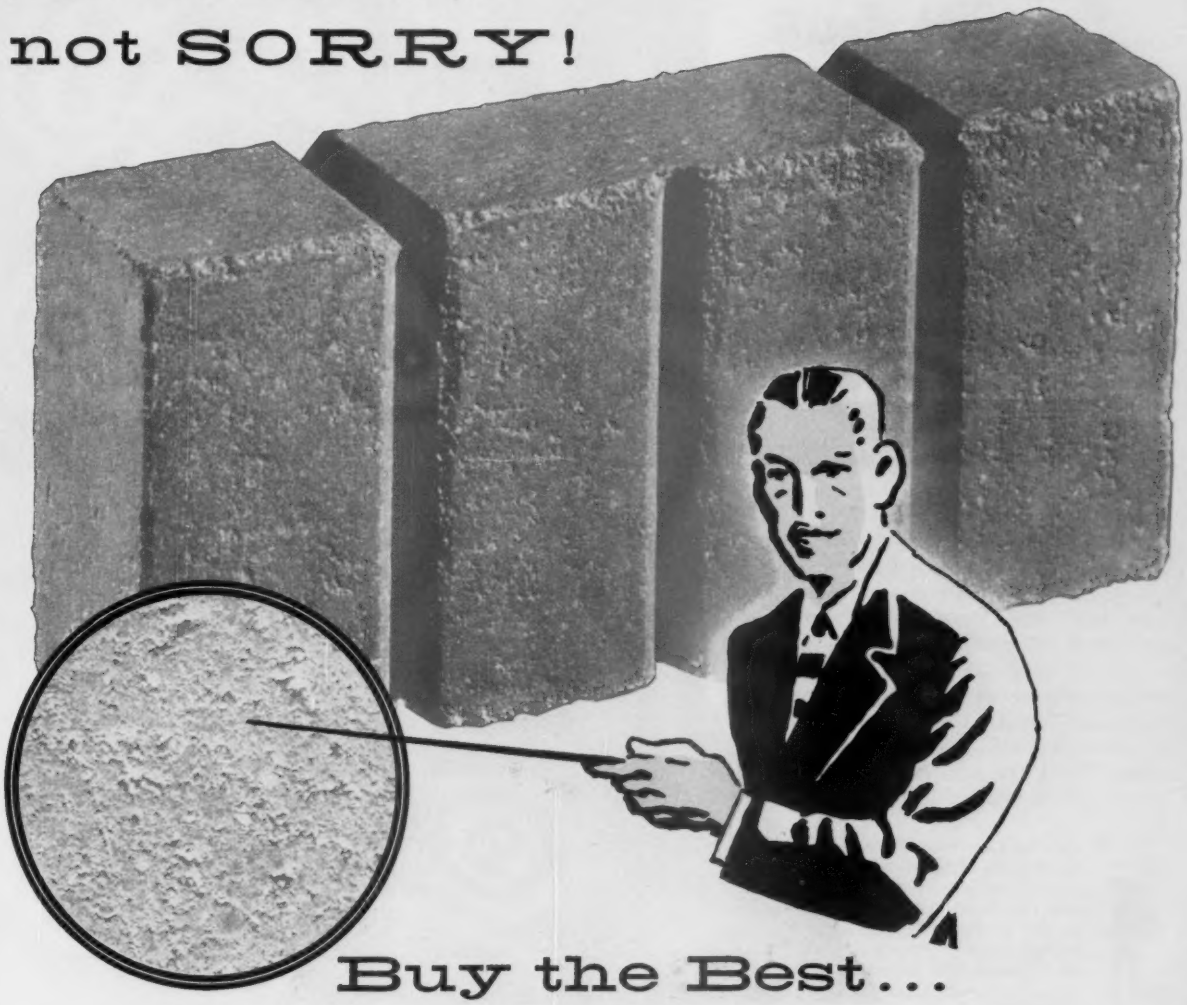


▲The key to better castings at The Bullard Company is this control panel, serving two 12-ton per hour cupolas. Top instruments are Model 40 Air Weight Controllers. Below are continuous Windbox Pressure Recorders.



Foxboro Butterfly Valve installed in one of the 24-inch blast lines. Valve position is controlled by Foxboro Air Weight Controllers shown at right.

Be RIGHT not SORRY!



Buy the Best...

use only *Famous* CORNELL CUPOLA FLUX

No iron is top quality unless it's clean, and Famous Cornell Cupola Flux is the one scientifically formulated product that increases dirt and slag flow off. Don't accept flux "just as good"—it pays to buy quality—The quality of Famous CORNELL Cupola Flux. It also cleans coke completely, giving you constant carbon content. Cupola maintenance is also reduced when you use Famous Cornell Cupola Flux.

Write for Bulletin 46-B

"often imitated but never equalled"

Have you tried Famous Cornell Aluminum Flux?

Have you tried Famous Cornell Brass Flux?

Write for Bulletin 46-A

The CLEVELAND FLUX Company

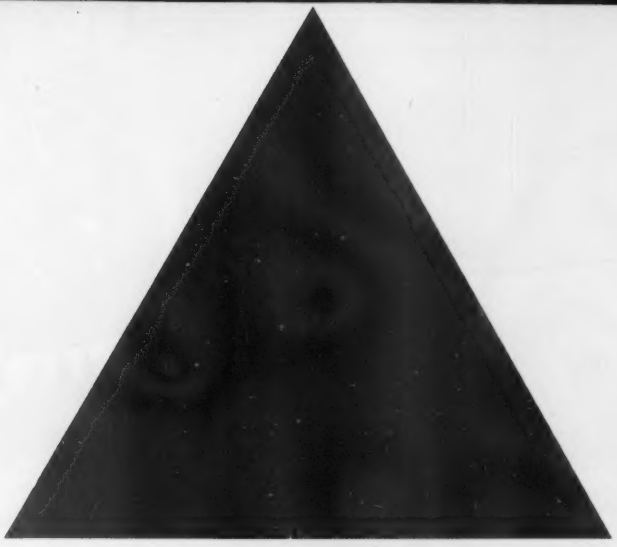
1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

VANCORAM GRAPHIDOX NO. 4



PERFECTLY BALANCED alloy of silicon, titanium and calcium that graphitizes and deoxidizes iron with maximum effectiveness and efficiency! Small addition increases tensile strength of high-strength irons . . . reduces chill . . . insures iron with normal graphite, free from dendritic structure. Graphidox No. 4 renders an iron compounded for very heavy sections suitable for light section work. The number of irons you need is reduced! It's easy to use, too — add at spout or in ladle (it's supplied in a size convenient for weighing and measuring). Write today for free folder about *proved, high-potency* Graphidox No. 4. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y.

Vancoram Products for the iron foundry are also distributed by: PACIFIC METALS CO., LTD. • STEEL SALES CORPORATION • J. M. TULL METAL & SUPPLY CO., INC. • WHITEHEAD METAL PRODUCTS COMPANY, INC. WILLIAMS & COMPANY, INC.

Producers of alloys, metals and chemicals

VANADIUM CORPORATION OF AMERICA

Push the button . . . then check your watch!

Rotoblast® cleans quickly and automatically . . . gives you *more* production with *less* manpower!

This control panel on the Pangborn Rotoblast Barrel is a symbol.

It stands for *speed*—push the Start button and a few minutes later you can push the one for Stop. It means *automatic operation*—just one man is needed to run it. And *quality*, too—between Start and Stop, whirling Rotoblast thoroughly blast cleans your castings to a silvery finish.

From original engineering through rugged construction to expert installation, Pangborn Rotoblast Machines are designed to satisfy you on every count—speed, performance, maintenance.

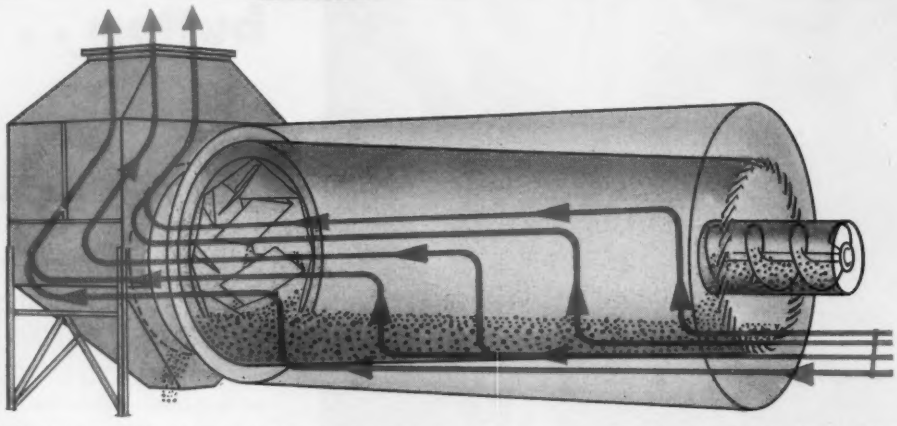
The Pangborn Engineer in your area will be glad to take off his coat and go to work on your *cleaning problem at no obligation. And, for more information, write today for Bulletin 226 to:* PANGBORN CORP., *1400 Pangborn Blvd., Hagerstown, Md. Manufacturers of Blast Cleaning and Dust Control Equipment.*

Pangborn Rotoblast Barrel for efficient batch cleaning. Available in 1½, 3, 6, 12, 18, 30 and 72 cubic foot sizes.

Clean it fast with **Pangborn ROTOBLAST**

Circle 600 on Page 51

More sand drying capacity in less space



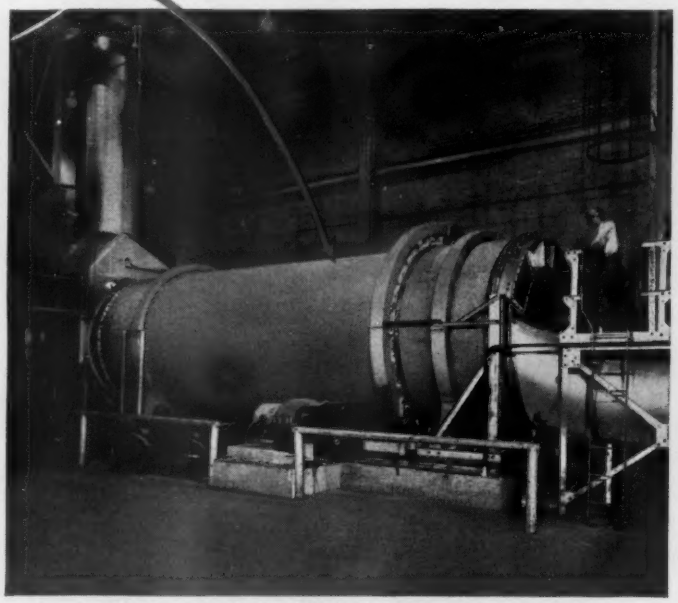
COMMON-SENSE DESIGN of Link-Belt Roto-Louvre dryers assures effective heat transfer. Compact machine has largest volume of air penetrating thin bed of sand near feed end, where greatest evaporation takes place. Gradual heat transfer from gentle rolling action over slowly revolving louvres eliminates spotty over- and under-drying. Sand is discharged at 120 to 135 F, containing a maximum of 0.5% moisture. In installations where temperatures as low as 100 F are required, a combination dryer-cooler can be furnished. Link-Belt builds eight sizes of Roto-Louvre dryers—1 to 60 tph capacities.

Dry, cool core sand from LINK-BELT Roto-Louvre dryer blends readily with core oil

PROPERLY dried and cooled core sand directly affects your core production capacity. That's why it will pay you to investigate the many advantages offered by Link-Belt Roto-Louvre dryers for increasing output—reducing costs.

Roto-Louvre's exclusive design controls temperatures throughout the entire drying cycle—exposes each grain of sand to exactly identical conditions. Uniform drying reduces retention time—permits you to dry more sand. Free-flowing sand is delivered sufficiently cool to mix with core oil without need for coolers. In addition, Roto-Louvre needs less than half the space required by other dryer-coolers.

Get all the facts from your nearby Link-Belt office. Or write for your copy of Book 2423 on Foundry Equipment . . . or Book 2511 featuring Roto-Louvre Dryers.



DRYING UP TO 35 TPH OF SAND, a large midwest foundry installed this Link-Belt Roto-Louvre dryer to provide additional sand capacity for increased production demands. In addition to low-cost efficiency, Roto-Louvre dryers minimize maintenance. Slow speed and the fact that sand rolls over itself, instead of sliding on metal parts, reduces wear.

LINK-BELT HANDLING AND SAND PREPARATION MACHINERY

MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, INC.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,598

Here's why Pangborn Dust Control boosts employee morale!

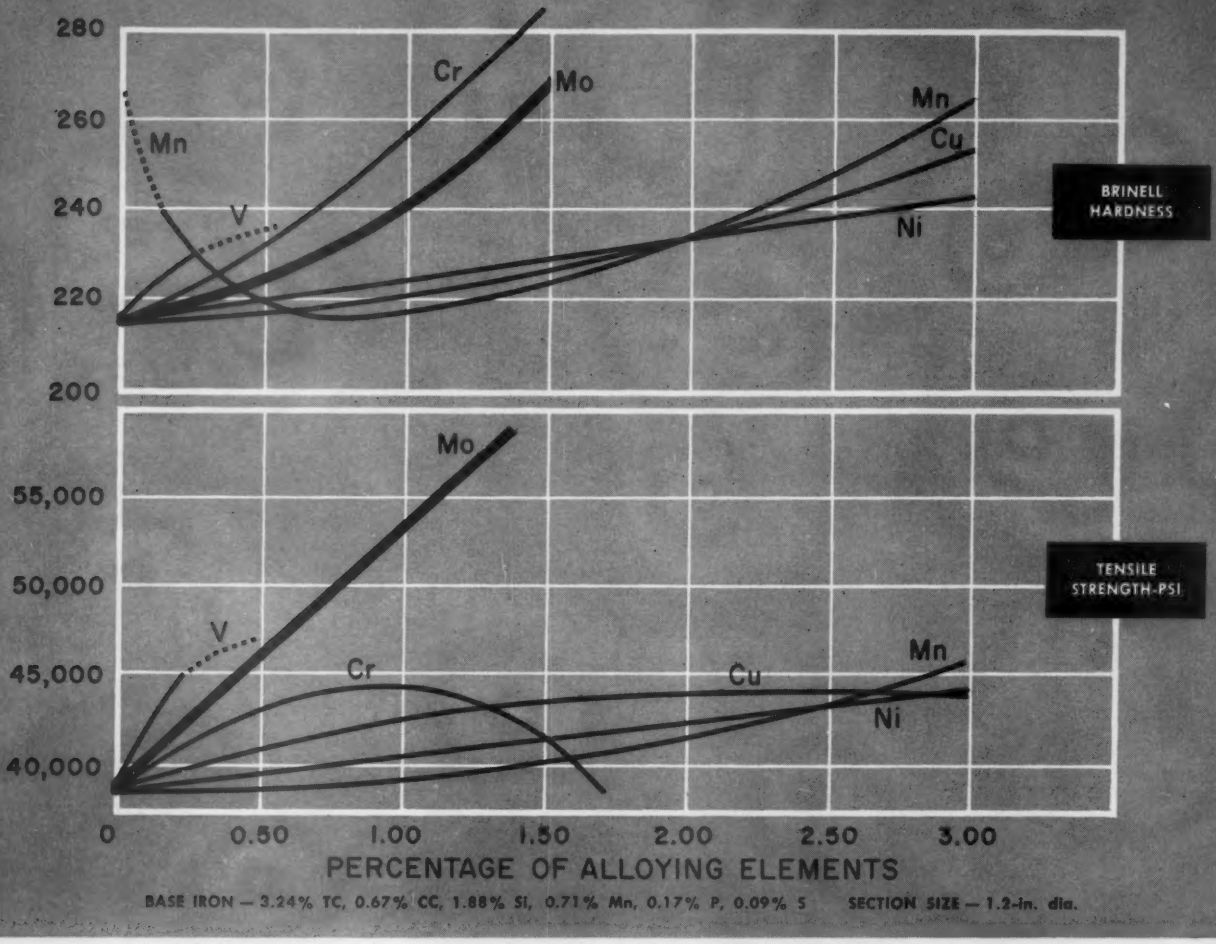
The answer is in this book. You'll see why Pangborn Dust Control makes your employees happier, healthier, more efficient in a dust-free plant. Why machinery life is lengthened, housekeeping costs reduced. Why you can reclaim valuable material for salvage. Why you can improve community relations.

Why *Pangborn* Dust Control? Because Pangborn offers the most efficient methods of dust collection on the market. Pangborn has spent 50 years dealing with dust problems . . . experience that is incorporated in every proposal. And Pangborn's extensive line of wet and dry collectors means that one of these units can be adapted with maximum effectiveness to *any* problem.

Send for your copy of "Out of the Realm of Dust." And remember: the Pangborn Engineer in your area will be glad to take off his coat and go to work on your dust problem at no obligation. PANGBORN CORP., *1400 Pangborn Blvd., Hagerstown, Md. Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn CONTROLS **DUST**

Circle 602 on Page 51



Note how additions of moly, up to 1.5%, produce proportional improvements in strength. And, with moly, hardness increases much more slowly. It means higher strengths can be used with less danger of impaired machinability.

each ½% Moly adds 7000 psi to strength of cast iron...

A little moly adds a lot of strength – for molybdenum increases strength more than any other common alloying element, with the exception of small vanadium additions. A rule of thumb is that fifty points of moly raise tensile strength 7000 psi. And without sacrificing toughness. Actually, moly improves toughness at least as much as strength.

What's more, versatile moly aids in obtaining uniform response to heat treatment . . . and in producing machinable, growth-resistant castings. Moly is easy to use, too.

With most grades of cast iron, moly requires no change in the character of the charge, normal melting practice, or the base metal. And foundrymen like the fact that the small additions necessary may be made at the spout or in the ladle.

Write now for "Why Moly Iron". It's the full story of how and why moly adds strength faster than hardness, how it increases fatigue and torsional strength—in short why moly makes better cast iron. Climax Molybdenum Co., Dept. 20, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM

Circle 603 on Page 51

Heavy sections like rudder posts and propeller blades can be gamma ray inspected with ⅓ shorter exposure—and welded seams can be radiographed more rapidly with available portable or low kv x-ray equipment—when Kodak Industrial X-ray Film Type KK is used.

. . . cut exposure time 1/3 with New Kodak Industrial X-ray Film TYPE KK

Where heavier sections are to be radiographed or where the output of available x-ray or gamma ray sources is limited, Kodak's new Industrial X-ray Film Type KK is the film to use.

This film shows as much as 50% increase in speed over the well-known Type K Film. It means more work can be done—that exposures can be cut by a third. And those who have tried Type KK tell us that its higher contrast, offsetting a slight increase in graininess, provides improved radiographic sensitivity.

To learn how Kodak Industrial X-ray Film Type KK can extend the service of your present radiographic equipment, get in touch with your x-ray dealer or Kodak Technical Representative.

EASTMAN KODAK COMPANY
***X-ray Division*, Rochester 4, N.Y.**

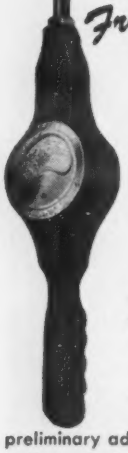
Kodak
TRADE MARK

Circle 604 on Page 51

QUICK—
ACCURATE
Temperature Readings
in Non-ferrous
Molten Metals with

XACTEMP
Trade Mark Reg U. S. Pat. Off.
HAND PYROMETERS

Accurate to Within a Fraction of a Scale Division



The XACTEMP PYROMETER makes possible better quality control and helps toward elimination of blowholes, burnouts, sand infiltration and other flaws due to incorrect temperature . . . affords a simple, effective means for accurate temperature measurement of molten, non-ferrous metals. Well-balanced, easy to handle . . . always ready for use and requires no preliminary adjustments.

Cast aluminum and brass construction. Indicator is of medium resistance not affected by thermocouple length . . . acts rapidly . . . provided with Alnico V magnet and direct reading dial starting at 50° F. 43" stainless steel extension . . . standard 7" Marshall tip permits true readings below surface of metal. Made to give good service for years. Order at once to be sure of immediate delivery from stock.

Catalog No. MM701 $68.50
Complete with Thermocouple..

Catalog No. 1449-501T Replacement
Thermocouple Tip $7.60

Ask about XACTEMP PYROMETERS for all-around general temperature checking. A full line of thermocouples available in stock.

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Thermocouple Supplies • Industrial Furnaces & Ovens
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607 West 30th Street, Chicago 16, Illinois
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Circle 605 on Page 51

Readers' Comment

Free Copies Are Available

To THE EDITORS:

I have been a very interested reader of FOUNDRY for about 30 years. But through many of those years, however, it has been a source of irritation to find valuable articles about foundry technique cut up in small pieces throughout the publication, and thus make the reading a kind of hide and seek. This has now, luckily, been improved upon, adding to the value of this excellent information.

When I recently read the articles in the September number of FOUNDRY, I found that this could still be improved upon, in the interest of the "Foundryfans" who collect these articles. If page 99 had been devoted to advertisements, we could have cut out this page and used page 100 as a front for the article on "Olivine Sand" without damaging the article about "Casting Salesmen."

If all the valuable articles could be cut out complete and collected in separate covers, I think this might start a collecting mania which would make the interest for FOUNDRY still stronger.

IVAR MATLIRSEN
A/S Sandnes Aducerverk
Sandnes, Norway

Editor's Note: Any reader who wants to save copies of the principal articles without cutting them out of an issue can do so by merely checking and mailing the card on Page 51.

A Matter of Chemistry

To THE EDITORS:

In reading my article in the January issue on "Shrinkage in Tin Bronze" I noted some changes made in the original copy which led to some inconsistencies in the printed article.

At the bottom of the first column on Page 87 where originally the word "propane" with the correct equation for its complete combustion was used, the word was changed to "methane" with the correct equation for the complete burning of that compound.

While I will go along with this change, the inconsistency enters, however, in the third line in the right-hand column where my statement of four volumes of propane was retained. It should have been changed to "two times that of the methane which was burned."

I have no special objection to the change to methane, but I would rather dislike having the reader, who might have studied high school chemistry, think that I didn't know more about gas volumes than the article seems to indicate.

CLYDE L. FREAR
3509 *Old Dominion Blvd.*
Alexandria, Va.

Advertising Cast Metals

To THE EDITORS:

It may be of interest to you to learn that about a year ago a central organization for the use of cast metals was established in our country to deal exclusively with the subject of advertising cast metals. We have printed and released four leaflets entitled as follows: Vol. I—Cast Iron in the Home (Building); Vol. II — Finely Shaped Creations through Casting; Vol. III—A Review of Improvement (Progress); Vol. IV—Castings in Machine Tool Construction.

We would be most glad if you, in due time, could publish in FOUNDRY a note in which these brochures are mentioned. Besides, we will appreciate your comments as well as information of how advertising of cast metals is tackled in your country.

PH. SCHNEIDER
Verein Deutscher Giessereifachleute
Sohnstrasse 70
Dusseldorf, Germany

Builds Inoculating Equipment

To THE EDITORS:

The writer read with interest your write-up on the pressure ladle installation at Cooper-Bessemer on Page 140 of your February issue.

Although it was not mentioned in the article, we are the manufacturer of this equipment. We have an exclusive licensing agreement with International Nickel to build these pressure ladles and inoculation stations for the production of ductile iron. We are also working with the German inventor of the equipment.

Although this development is rather in its infancy, we have made four installations to date and feel that it has great potentials.

C. F. EITING
President
Industrial Equipment Co.
Minster, Ohio

Now you can get steel shot performance without paying steel shot high prices! Metal Blast's "SEMI-STEEL" abrasives have all the steel shot characteristics, but sell at malleable prices. Why pay more? Change to "SEMI-STEEL" and save the difference!
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Circle 606 on Page 51

Sterling flasks are made to cope with tough foundry production schedules!

● You may ask: "Why do Sterling Flasks seem to last forever, even when subjected to tough foundry usage?" The answer is simple. Sterling uses *rolled steel* — not pressed steel. Tensile strength of 70,000 p.s.i. adds many years of hard service life. Made of special hot rolled steel channel, with controlled copper bearing and carbon content, Sterling Flasks are welded into one solid, rigid piece. In addition, a center-rib is rolled into each section to fortify against torsional and other strains. You get heavy flanges with square corners and full width bearing. Partings are accurately machined to .005" precision. Yes — Sterlings are built for a long life of hard service. They enable you to produce better castings at a bigger profit. Write today for Sterling Catalog.

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Manufacturers of Foundry Equipment for Almost a Half Century!

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Horizons Unlimited

Looking beyond the present problems of low business activity, Allen M. Slichter, president, Pelton Steel Castings Co., Milwaukee, told the Wisconsin Regional Foundry Conference last month that "We in the cast metals industry have a grand future if we don't boot it. What we do in technical and market research will go a long way toward telling the story." But after gathering data on group research activity, he concludes, "Presently we are not giving research adequate financial support."

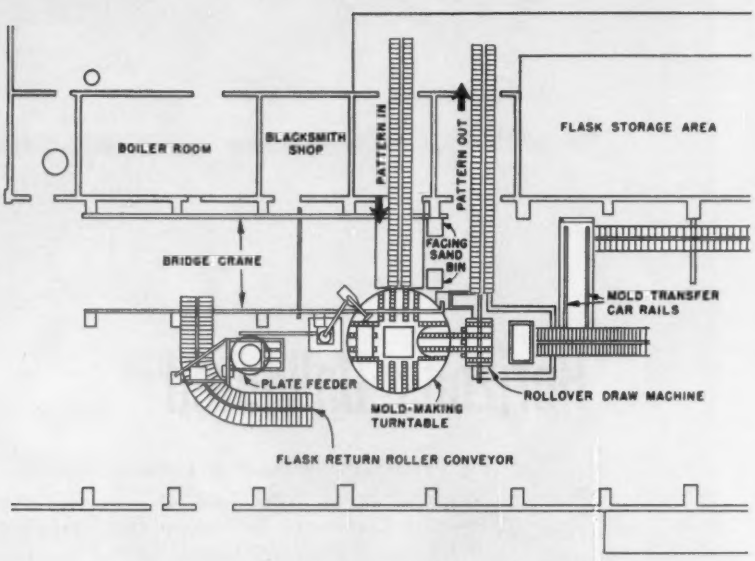
Although complete expenditures for technical research are not available, he learned that the following was spent last year: Steel Founders' Society of America, $125,000; American Foundrymen's Society, $48,000; Gray Iron Research Institute, $40,000; Malleable Founders' Society $15,000; Gray Iron Founders' Society, $10,000. Allowing for some research expenditures on the part of other foundry groups, it is believed that technical research for the cast metals industry, except for private research, totals only about $268,000. With a total yearly sales value of $6½ billion, the amount spent for research was only 0.00004 cent for each dollar of sales—"An infinitesimal amount that can hardly be expressed in terms that have any meaning."

Considering market research, Mr. Slichter pointed to the fact that the country is full of weldments, machined parts, forgings, and fabrications that should be castings because castings are more economical, have engineering advantages, and offer eye appeal. Some individual companies and trade associations are doing an excellent job in promoting conversions to castings, but this work should be enlarged.

Too little is being done in the long-time phase of market research. Work should be under way to study future demands, to determine if possible what the industry will be called upon to supply 10 or 15 years from now. It was recommended that studies on future markets receive equal consideration with technical research—in time, money, and effort.

Mr. Slichter should have complete industry support in his conclusion that if we meet the challenge of production and of marketing, if we determine what the future needs of the economy will be and prepare to meet them, "Truly, our horizons are unlimited!"

Frank G. Steinebach
Editor



Layout of the large castings foundry. Production line at near right makes castings up to 3000 lb. At far right is the line for parts to 500 lb and the floor molding area

Foundry Modernization

To Double Production in Ten Years

Facilities for producing gray iron castings weighing up to 3000 lb are described in this first of three articles covering operations in the foundries operated by General Electric Co. at Elmira, N. Y.

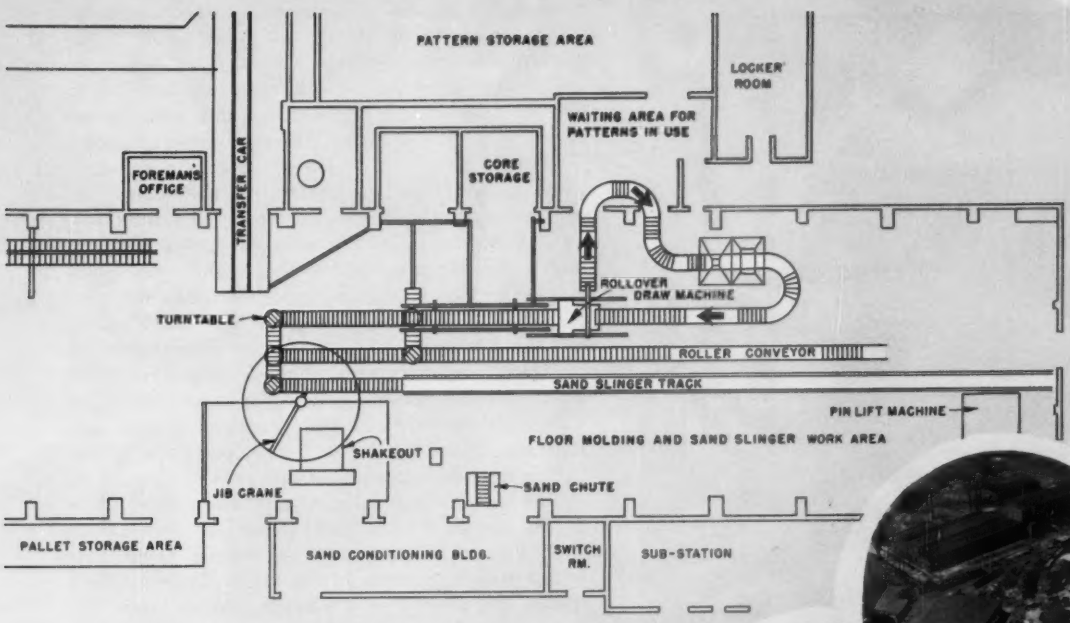
By ROBERT H. HERRMANN
Associate Editor

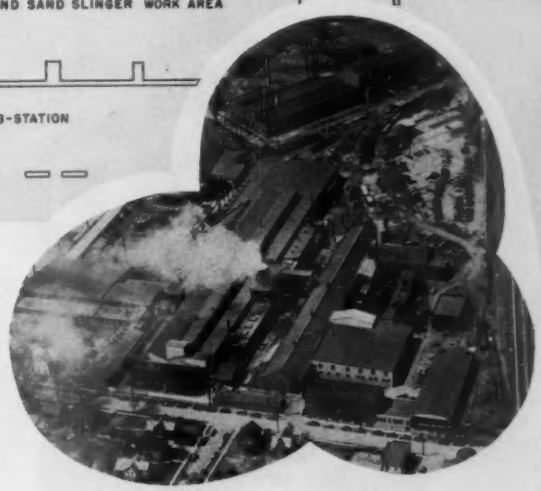
GENERAL Electric Co.'s foundries at Elmira, N. Y., are engaged in a modernization program expected to increase castings production 50 per cent in five years and 100 per cent within ten years. This is to be done in existing buildings.

Management's decision to modernize was based on the forecast that within the next ten years the country's working force will increase 14 per cent while the need for products will go up 40 per cent. In that same period, however, the demand for electrical products is expected to increase 100 per cent. The unfavorable balance between available working force and demand for products will create a labor shortage for several years. Consequently, it is felt that productivity per worker must be increased through mechanization and that foundry work must be made more attractive to compete for workers in the short labor market.

Furthermore, GE's employee relations activities are in tune with the growing realization that the working force is a foundry's most important tool. Good relations depend primarily on good communication between management and employees. Some of the instruments of communication used by GE are its plant newspaper; its management news letter which is circulated to managerial and professional people; reading rack material on a variety of subjects; the mailing to employees' homes of booklets on cancer, safety, vacation suggestions, and other topics; and a suggestion system which pays a remuneration to employees whose ideas are accepted and put into effect.

Communications which deal more directly with employees' work are the state-of-the-business talks





Aerial view of GE's Elmira Foundries

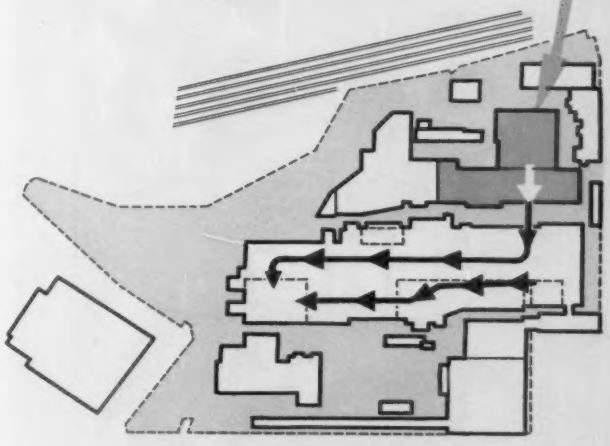
given periodically for all employees by the general manager of all GE foundries, the local manager of each foundry, plus others in the finance, engineering, employee relations and marketing sections. Also, before new equipment or a new process is to be put into operation in a given foundry area the general foreman discusses the project with the men in his department, asking for suggestions, comments, and criticisms. Consequently, there is little resistance to a new program because employees have had a part in its planning.

Safety and health measures also are part of a good employee relations program. The company furnishes certain items of safety equipment to workers and insists that the equipment be worn. Additional equipment such as safety shoes may be purchased at low cost from the company-operated store.

The company also maintains a dispensary staffed by three full-time nurses and a part-time doctor. Yearly physical examinations are given to operators of truck, crane, and other motive equipment. In addition, all employees are entitled on a voluntary basis to have an X-ray examination once a year.

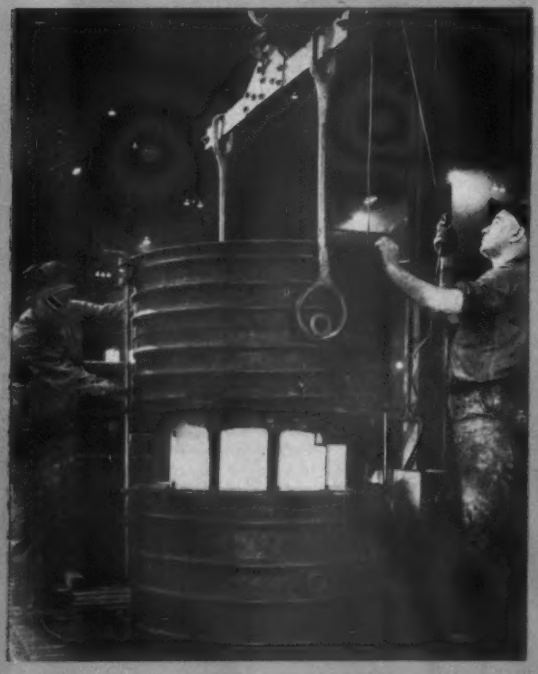
Makes Variety of Castings—Castings production facilities at Elmira are separated into four foundries which handle different sizes and types of work. The entire operation produces gray iron parts for electric motors, heating and air conditioning equipment, turbines, power distribution equipment, instruments, and appliances. Castings also are produced for the textile, automotive and machinery industries.

The foundry which makes large castings on both a high and low-volume basis has two conveyor line



Layout of the company's foundries shows flow of castings to shipping room. The large castings production foundry and pattern storage area described in this article are shown in solid color

Patterns for castings up to 500 lb are conveyed to a jolt table under a sand hopper



After any desired cores are set, the molds are closed with the help of a bridge crane

units and a side floor for hand and sandslinger molding. The lines utilize normal production equipment engineered to handle as many as 40 to 50 pattern changes per shift.

One line produces castings weighing from 25 to 500 lb. Molding, core setting, and pouring are done on a gravity roller conveyor mounted about 2 ft above floor level. One section of the conveyor loops around near the pattern storage room. An operator loads board-mounted cope and drag patterns onto the roller conveyor in proper sequence and pushes them around to the rigging area where a worker uses a jib crane to set flasks over the patterns. These assemblies then are rolled onto a jolt table installed in the conveyor line under two 10,000-lb capacity sand hoppers equipped with hand-operated bottom gates. Flasks are half filled with sand, jolted, and the necessary gaggers and rods set. Hand ramming, if required, is performed in this area with pneumatic rammers.

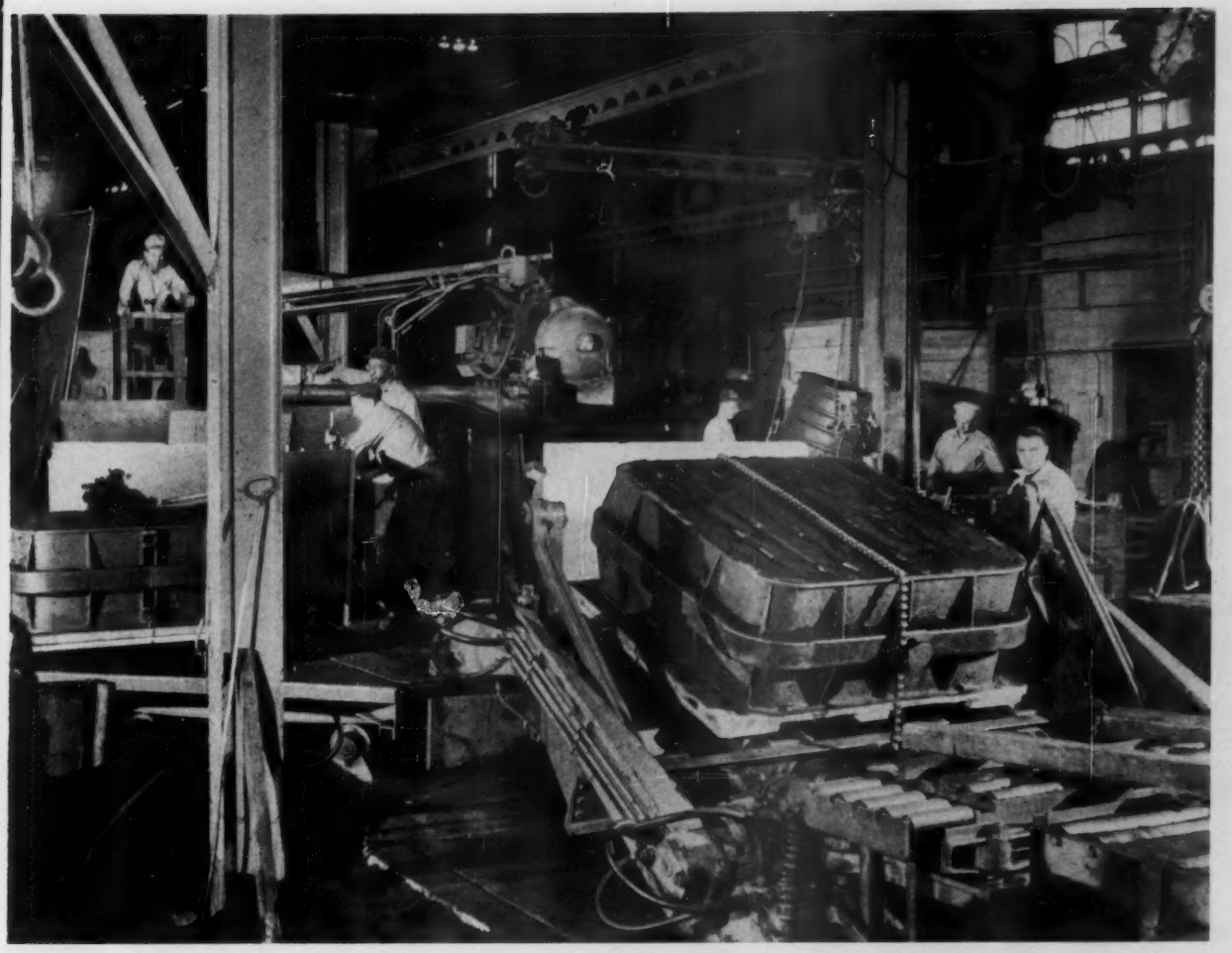
The half-rammed molds are pushed around a loop in the conveyor to a straight section along which ramming is finished with a mobile sandslinger which travels on rails in the floor. Finished mold halves are pushed to a 1500-lb rollover-draw machine, and drawn patterns are returned by monorail hoist to the starting point of the roller conveyor. If additional castings are to be made from a given set of patterns, they continue around the loop. Otherwise they are removed from the conveyor and returned to storage.

Cores Are Set and Molds Closed

Finished mold halves are pushed along the straight section of the conveyor to the core setting area. Cores are set and the molds closed with the help of a bridge crane. Molds are clamped and dry sand strainer cores and pouring basins are set in place. The weight of the casting and the grade of iron in which it is to be poured are marked with chalk on the pouring basin. Completed molds then are pushed to a hand-operated swiveling section of roller conveyor from which they are moved to a second swiveling section in a parallel roller conveyor. Here they are lined up for pouring from ladles mounted on electric hoists suspended from a bridge crane.

A jib crane swings poured molds to a hooded, vibrating shakeout and returns the flasks to the same conveyor. A bridge crane is used to move the flasks back to the molding area. Castings are lifted from the shakeout by the jib crane and placed in tote boxes for movement by electric platform truck to the cleaning room. The same truck transports bull ladles of molten iron from the cupola to this molding line. Cores are brought to the line by hand truck.

Castings which weigh up to 3000 lb and are required in quantities of only one or two a year are made in a floor area adjacent to the molding line. Molds for these castings are rammed with the mobile sandslinger, and most of them are skin-dried with gas torches. A bridge crane is used for setting flasks, bringing in and setting the cores, closing the molds, handling the ladle for pouring, set-



A sandslinger rams molds on a turntable in the line producing castings up to 3000 lb. Mold halves roll from the turntable to a rollover draw machine

ting poured molds on the shakeout, and returning the flasks.

Produces Larger Castings—The second line of this foundry produces castings weighing up to 3000 lb. Patterns for this line are brought from storage on electric platform trucks and are set onto a waist-high roller conveyor by an overhead traveling crane.

Patterns are loaded in proper sequence and pushed to the rigging area where a crew of two men uses an electric hoist on a bridge crane to set flasks over the patterns. Required loose pattern pieces and ram-up cores are set, facing sand is shoveled into a flask, and bars and gaggers are placed in position. The partly-filled flask is rolled onto short gravity roller sections mounted in a 20-ft-diam, four-station turntable. When the turntable is indexed to the second station, ramming is completed with a remote-controlled sandslinger. At the third station molds are struck off manually, and at the fourth station the short section of roller conveyor is tilted by air cylinder so that the completed half mold rolls off to a 10,000-lb rollover draw machine. Drawn patterns are moved by hoist to a roller conveyor which is parallel to the incoming pattern conveyor. At the end of the return conveyor, patterns are trucked to storage or moved to the incoming conveyor if additional castings are to be made.

Completed half-molds are pushed off the rollover machine to a cable-operated, roller-topped shuttle car which rolls by gravity down an inclined set of rails to align with a floor-level roller conveyor. The half-molds are pushed off the car to this conveyor for coring and closing and then are moved by bridge crane to the pouring floor. The same crane transports poured molds to the previously described shakeout and returns empty flasks to the molding area. Castings are moved by electric truck from shakeout to the cleaning room.

Sand Preparation Is Automatic—Used sand falls through the shakeout to a belt conveyor and travels over a magnetic separator to an oscillating pan conveyor which feeds a bucket elevator for ultimate discharge into an 80-ton storage hopper. Air-operated gates at the bottom of the storage hopper release sand to a weigh hopper which actuates a solenoid to close the gates when 1200 lb of sand has been received. Sand falls from the weigh hop-

Large molds made on the turntable are finished and cored on a roller conveyor, set off on the floor, closed, and poured from a ladle suspended from a crane

per through air-operated gates to an automatic, continuously cycling muller. An automatic sand moisture and temperature determining device governs water additions to the mix. Dry components are weighed and added by hand during the 1½-minute cycle. Prepared sand is discharged to a bucket elevator which feeds an 80-ton prepared sand storage bin.

Sand mixes consist of batches of system sand, to which sea coal, woodflour, and western bentonite are added. Samples of the mix are tested every half hour. The desired properties are 3.8 per cent moisture, 85 green permeability, 5.5 psi green strength, 80 psi dry strength, 30 psi hot strength, 70 minimum flowability, 0.02 in. per in. deformation, and 8.7 pH factor. Generally, this last value is held rather closely by additions of facing sand to the system. Much attention is paid to holding a sand toughness number of 110. This is an index of sand workability obtained by multiplying the green strength by the deformation.

A belt conveyor under the prepared sand storage bin delivers sand to a bucket elevator which empties onto an overhead belt distribution system which supplies sand to the mobile sandslinger, the two bins over the jolt tables, and to the stationary sandslinger which rams molds on a turntable in the second molding line in this foundry.

The facing sand mix used on this line is discharged into a hopper from which it is shoveled into the flasks. The facing mixture consists of 50 per cent Port Crescent sand of 55 AFS fineness and

50 per cent McConnellsville sand of 100 AFS fineness. To each batch of sand are added western bentonite, a woodflour-carbon mixture, corn starch, and water. Each batch of sand is checked for the following desired properties; 3 per cent moisture, 95 permeability, 5 psi green strength, 50 psi dry strength, 50 psi hot strength taken at 1100° F after a 12-minute soak, 0.022 in. per in. deformation, and 110 sand toughness number.

Coreroom Operations—A coreroom is located at the end of the building housing the large casting foundry. It is equipped with four jolt-rollover-draw machines, one coreblower, four benches, and a long, open area where cores are hand rammed in boxes set on low wooden horses. Eleven mixes of standard core oil formulated sands are mulled in 1000-lb batches. In preparation of the mixes, solid ingredients are weighed, and oil and water are metered for accurate proportioning.

Core sand is delivered to the foundry in hopper cars which empty over a grate opening in the track. Sand falls through a chute to a bucket elevator which feeds, through a switching arrangement, to two storage silos. Air-operated gates at the bottoms of these silos release sand to a skip bucket used to charge the muller. Prepared sand is discharged into a tilting bucket suspended by an electric hoist which is electrically driven along an overhead monorail. Thus, the sand is delivered to the various coremaking stations in the coreroom. Green cores are loaded onto racks and moved by electric platform trucks into gas-fired, batch ovens where they are baked at 450° F for various times depending upon core size. Cores produced in this area range in weight from 1 to 2000 lb. Baked cores are moved by electric platform truck to a finishing area where they are pasted or bolted into assemblies. Most cores are given a wash which is colored to indicate the different sand mixes used. Four additional batch-ovens in this area are used to dry washed cores. Electric and hand trucks transport cores to the molding areas.

Use Continuous-Pour Cupolas—Iron for the large casting foundry as well as for the medium casting foundry is produced in two cupolas located adjacent to the mold car conveyor serving the medium casting foundry. One 42-in. cupola with capacity of 10 tons per hr is operated during the day shift. The other cupola, lined to 36-in., has a capacity of 6 tons per hour and is operated during the night shift. Both are front-slagging units, and they are tapped continuously into forehearths heated by gas torches.

Raw materials delivered into the foundry yard in gondola cars are unloaded by a railway car crane. The materials are segregated into open-front bins. A scale car carrying two drop-bottom charge buckets operates on a track in front of the bins. Operators fork the materials into the charge buckets and then position the scale car under an overhead monorail cupola charger. The buckets are lifted by the charger and transported to either of the cupolas through a switch in the monorail.

Molten iron for the large casting foundry is transported from the forehearths to the pouring area in bull ladles carried on an electric platform truck. Metal for the medium casting foundry is tapped from the forehearths directly into pouring ladles electrically propelled on a monorail loop and synchronized with the speed of the mold car conveyor.

Succeeding articles will describe operations in the plant's sand foundries for medium and small castings and in the permanent mold foundry.

• An extra copy of this article is available until supply has been exhausted. Check Reader's Service Card, Page 51.

A corebox is rolled out from a coreblower to a rollover draw machine which removes the core

Numerous cores, particularly those required in small quantities, are hand-rammed at benches

An effective training program gives an overall understanding of a company's operation

How Foundries Are

Training Engineers

To exploit the potential of an engineer, you must train him effectively. This article suggests some of the elements of good training programs, including helpful case histories

By JACK C. MISKE
Associate Editor

A PREVIOUS article (FOUNDRY, April, 1957, p. 100) discussed in some detail the problems involved in recruiting foundry engineers. As that article noted, however, recruiting is only the first step in acquiring personnel to cope with the increasing mechanization and technological progress of the industry. Hiring must be followed by a training program which will exploit the full potential of the newly recruited engineer.

What You Get—Successful establishment of such a program provides three obvious and important returns.

First, the engineer who is placed in an effective program enjoys a sense of security and of belonging to the organization of which he is a part. He feels rightly that the company knows what it is doing and that it has a job for him to do as soon as he has been prepared properly. He will be much less likely to leave than a man who is brought into a situation where he is forced to flounder. Such a man inevitably feels that he is neither particularly important nor needed. His usefulness is debatable, even if he stays with the job.

Second, the man who is properly trained is in a much better position to become a valuable employee. Effective training enables him to use his native abilities to the full as much as it sets him up psychologically to want to use his potential.

Third, effective training most quickly brings the employee to the point where he is efficient and productive.

Objectives—In short, there can be no question about the value of good training. This point applies to all new employees, of course, but perhaps a little more to engineers, who are a slightly different breed from others and likely to be destined for greater responsibility.

Nonetheless, in some companies, the word "training" evokes such reactions as these: 1. "It's good for other foundries." 2. "We're too small." 3. "The foundry is different." 4. "It took me 30 years, and I can't see how anyone can learn anything in a training program."

There is no need to argue with such attitudes. The essential fact is that foundries of all sizes have successful engineer training programs in operation and are benefiting from their success. Some of these programs will be described in this article. Their establishment requires nothing else so much as an initial push from top management to get the company off dead center. After that, a program can be developed to fit the needs of the foundry.

Many training techniques are available, including job rotation, formal study courses, guided experience, and others. As many of these techniques as are needed can be adapted to a program that will do the job for a given foundry. Any program, however, no matter how it is set up, must work toward several fundamental objectives common to all:

1. To give the new engineer a broad view of operations and products so that he can see his own work in relation to the whole activity.

2. To demonstrate to the engineer the variety of methods by which he can apply his technical education to the solution of the employer's problems.

3. To provide enough specific training to prepare the engineer adequately for his permanent job.

Length of Program—Like the content, program length should be adapted to the needs of the foundry. In addition, the length of any particular program and of its sections should be flexible enough to fit the needs of the individual. Factors to be considered include the type of job for which the man is being prepared, the type of formal training he has had, and the kind and amount of on-the-job experience he possesses. For example, in larger foundries, the area of emphasis would vary with metallurgists, production employees, casting salesmen, and other types of trainees. Smaller plants would, of course, aim for all-round versatility, with less specialization.

Programs therefore vary in length from a few weeks to more than a year. One point should be kept in mind. The program should not be dragged out. Adjust the pace to the individual's abilities. Don't permit him to feel that he's being held down without being given a chance to show what he can do. When he's ready, put him to work, and everyone will benefit.

Program Content—In general, a foundry training program falls into two parts: 1. A period of orientation. 2. A longer period of job rotation interspersed with general subjects presented in conference sessions or, especially for single trainees, in office visits.

Orientation—The orientation period can be a crucial one, for many reasons. Its purpose is twofold—to help the new engineer to adjust to his new surroundings and to enable the other personnel to adjust to him. In this phase he must become acquainted with both the physical layout of the plant and the people who compose its social community. He must learn to get along with the people as much as he must know the production processes. During this period he also should be indoctrinated about management policies and organization, and he must reconcile his education with the actual practices of the plant.

A good training program makes the engineer feel that he is part of a well managed organization

Job Rotation—After orientation, real training begins. Ordinarily, as descriptions of actual programs will show later, job rotation is the core of this training. As we noted earlier, in relation to the whole program, there is no typical plan or schedule for this portion of the program. The engineer's training, his experience, and the sort of job for which he is being prepared require an adjustment of the schedule to emphasize some areas and to de-emphasize others.

Generally, however, job rotation is set up so that the man is exposed to every department and activity in some degree, regardless of what type of work he is to do eventually. With this sort of background, he is able to take an over-all view of the plant's operations and their relationship to his own activities. Additionally, he meets more employees, gets to know them better, and learns about their problems and abilities. The sequence of jobs and the length of time on each thus is a matter for the individual foundry to adapt to the individual trainee, particularly in smaller plants.

Training Reports—Customarily, two reports are made as the trainee completes each job assignment. One of these is made by the trainee, who describes what he has learned and what his general impressions have been. It is important here to be sure the trainee understands he is not a spy. He shouldn't be, of course, since nothing else would more quickly

disrupt both the training program and personnel relations; but it is just as vital that he have no misunderstanding of the matter.

The second report comes from the supervisor under whom the man worked. He rates the trainee on such points as application, ability to learn, interest in work, accuracy, co-operation, self-reliance, judgement, and originality. In closing, he gives an over-all rating—sometimes in the form of an answer to the question "Would you like this man to work for you?" Management should keep in mind the importance of supervisor's attitudes to the success of the program. They must themselves be trained to understand and to work for the purposes of the program.

What Not To Do—During this period of job rotation, a couple of pitfalls must be avoided. For one, engineering trainees should not be assigned menial jobs such as window washing or aisle sweeping. Hard work is perfectly proper, but only in the line of constructive training.

Secondly, avoid boring the trainee and antagonizing your other employees. Don't keep him on a job any longer than he requires to familiarize himself

Training begins with orientation. The engineer learns to know his company and its employees

with it. Don't train him to be a production worker —after all, he isn't going to be one. Instead, make his assignments challenges to his training and intelligence to as great a degree as you can.

Some foundries have experienced difficulties in assigning trainees to jobs covered by bargaining units. Unions are concerned about a trainee's replacing a union man on the job. Most union leaders understand the need for technically trained men, however, and one solution to this problem is a contract provision covering the employment of one or more engineer trainees in a job-rotation program.

On the other hand, the problem may never arise at all since the trainee is likely to be on a monthly salary rather than an hourly wage. If the type of job he does during training creates an issue in itself, a contract provision again is the best solution to the difficulty.

The conclusion of the program is followed by evaluation and job assignment. Permanent assignments are made on the basis of composite performance records, observed and estimated qualifications, major interests of the trainee, and job availability.

Thus far, we have discussed the engineer training problem in terms of general principles. Let's take a look now at what is being done at specific foundries of various types and sizes. To be systematic, we'll start with the smallest and work through to the largest.

100 Employees—At a quality jobbing shop in Michigan, two types of training are done. The more common involves young men who still are students. Usually two are high school graduates getting ready to go to college, and two are college undergraduates. The other type of training, understandably rare in a company of this size, is for graduates who are permanent employees.

Training at this plant is planned, but it is informal and on a highly personalized basis. Personal contact and instruction are the outstanding features of the program. Trainees are moved around the foundry so that they acquire over-all experience in the various departments. The plant metallurgist and the plant engineer are the key men, and trainees usually do specialized work under their direction. This work includes such varied activity as development in the shell mold department, statistical quality control work, and ultrasonic testing, in addition to the usual foundry assignments.

250-500 Employees—A midwestern steel foundry employs a "break-in program" notable for its brevity. Designed to acquaint trainees with the men, jobs, and departments in the plant, it customarily covers only about a 7-week period.

One week is spent in production control, two weeks in inspection and quality control, one week in the coreroom, one week in the melting department and laboratories, and two weeks on pouring and shakeout.

500-1000 Employees—At a Great Lakes area malleable foundry doing jobbing work on a production basis, the engineer training program requires about 1 year. This plant, which normally employs about 850 people, calls the program "Management Development." Its aim "is to orient the engineer with respect to our plant, our methods of operation, and our people, and to integrate him, his knowledge, and experience into our organization to do the most effective job."

The program provides work experience in all phases of the company's operation. The trainee is required to do some work with his hands because the company feels that he should be able to instruct employees in the proper operation of equipment used in production. He is expected to have a thorough understanding of how each department operates internally and how each is tied to others in the total production picture. Staff and administrative functions such as cost accounting, purchasing, and sales are included as well as production functions.

This sort of schedule is important to the company. It expects all people in the management group to be aware of problems in the business and to help actively in their solution, regardless of the department in which the problem exists. Consequently the pro-

gram is meant to widen the individual's horizons and multiply his avenues of promotion. As a result, the company enjoys an important flexibility within the management group.

The program calls for reports both weekly and after the completion of work in a given area. This procedure not only provides a check on the trainee's understanding, but of his ability to put his thoughts on paper—something the company feels is extremely important.

As an integral part of the program, each man is given a project which can be followed through to its completion. This assignment "gives the man a sense of accomplishment which often can carry him over periods when the new routine of industry has worn a little thin and helps to keep him from becoming discouraged."

500-1000 Employees—Another plant in the same size group offers a similar yet somewhat different program from that just described. This foundry is a captive gray iron operation tied to an eastern manufacturer of engines, compressors, and turbines.

At this company, the program is similar in that a 1-year job rotation is employed. It differs from a jobbing operation, of course, in that trainees are dealing with specific products about which they require some knowledge. The 11-month basic rotation plan is supplemented by a 1-month assignment on a project of the trainee's choice. Ordinarily, this project involves the type of work which will be the man's final assignment.

The chief point of difference lies, however, in formal courses made available to trainees through the company's training departments. These fall into two main categories—technical and management courses. They are designed to bridge the gap between the college approach and the techniques used in industry. Other employees also attend them. Instructors include college professors, professional people, and company employees.

More than 1000 Employees—The foundry division of an automotive company may seem like an odd place to go for examples since its size is far from typical. Nontheless, much can be learned from it. Few companies train as many foundry engineers as this one, which employs thousands of persons in its various foundries.

The division regards its recruiting, training, and on-the-job development as parts of an over-all training process. It feels that "the only development is self-development and the easiest way for a man to develop is to provide the opportunity for him and with guidance and counseling to leave the rest up to him."

After selective recruiting, the company places trainees in a 6-month formal training program. Basically an orientation program, it is meant to acquaint them with the organization, the way things are done, and the policies, procedures, and traditions they will have to live with when they have received their permanent assignments.

Each man is scheduled through every department in his plant. The length of time that he spends in any one department varies from a few days to a month. It is predetermined by an education and training committee which bases its decisions on size of the department, number of jobs available, and complexity of operations. Supervisors are available to answer questions and give any information the trainee requests: "Development takes place almost directly in proportion to the initiative and inquisitiveness of the trainee."

Hard work is a part of his training, but don't give the engineer unconstructive, menial jobs

Each week, four hours of classroom sessions are scheduled. Two hours are devoted to sessions conducted by department heads who explain operation of their departments, how they are organized, how they fit into the organization, and what the problems of each are. The second two hours are devoted to management sessions in which policies and procedures, history of the organization, management skills, and management knowledge are taught. In addition, trainees attend management information meetings held for all management people.

On completion of the six-month program, trainees receive permanent assignments. The first eight weeks on the job are an intensive training period, usually spent with an older employee who is familiar with the assignment.

Planning Is the Secret—In summary, then, it is obvious that no such thing as a typical training program for foundry engineers exists. In fact, the very nature of the industry and its component companies virtually precludes such a possibility, except for the almost universal orientation and job-rotation plans. Essentially, the key to effective training is planning, no matter how simple or complex the program. Plan carefully, then be certain the plans are carried out. Don't short-circuit the program. Exploit the full potential of your engineering trainees.

Acknowledgment—The editors of FOUNDRY wish to express their gratitude to Edward J. Walsh, executive director, Foundry Educational Foundation, and to the many foundries who outlined their engineer training programs for their co-operation in the preparation of this article.

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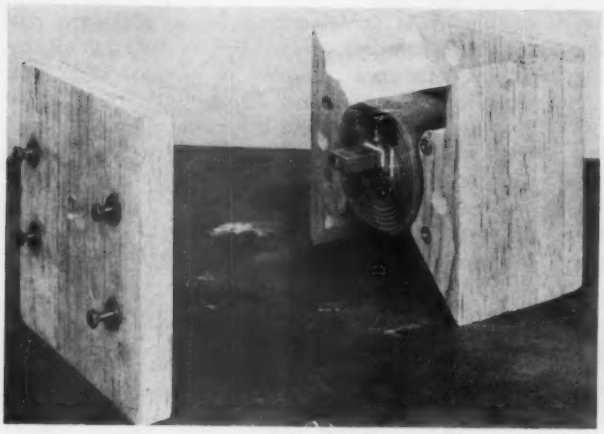

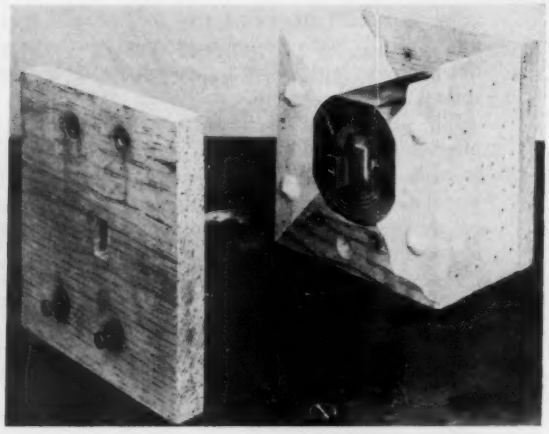

Fig. 2 (left)—Exploded view of multiple corebox. Fig. 3 (right)—Another exploded view, showing how the first two quadrants formed become sides of box

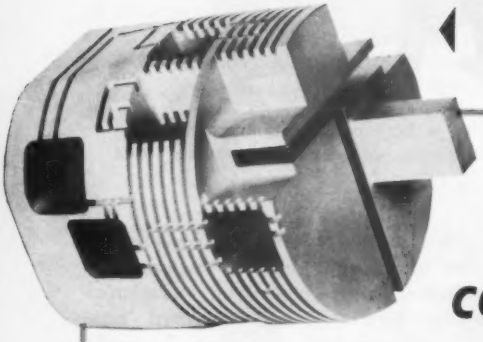

Fig. 1—Experimental rigid fuze body is a cylinder approximately 4½ in. in diameter and 4½ in. long

CO_2 Process Useful in

Producing Experimental Castings

CO_2-hardened molds provided a convenient method of producing several experimental rigid fuze bodies at Frankford Arsenal. Here's a description of the procedure developed to handle the assignment

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THE carbon dioxide process was developed originally as a supplemental means for making cores. It has been extended in some cases, however, to include use as a mold material. One such case arose recently when the Pitman-Dunn Laboratories, Frankford Arsenal, were requested to cast several experimental, rigid fuze bodies.

Design characteristics of the casting were such that neither the investment casting nor shell molding process would conveniently lend itself to this application. Certain features of the carbon dioxide process indicated that an attempt should be made to adapt it to the production of these castings. The complex coring problem associated with the fuze body could be most simply handled by this process, since all the cores could be made as integral parts of the mold. This procedure would minimize inaccuracies in fit between separate cores and core prints.

Master Pattern—The rigid fuze body is a cylinder, as shown in Fig. 1, approximately 4½ in. in diameter and 4½ in. long. Fourteen pockets, 1 x 1 x 1½ in. deep, are so positioned as to require six different draw directions; one is at each end and four are spaced every 90 degrees around the

*Formerly 1st Lieutenant, Ordnance Corps.

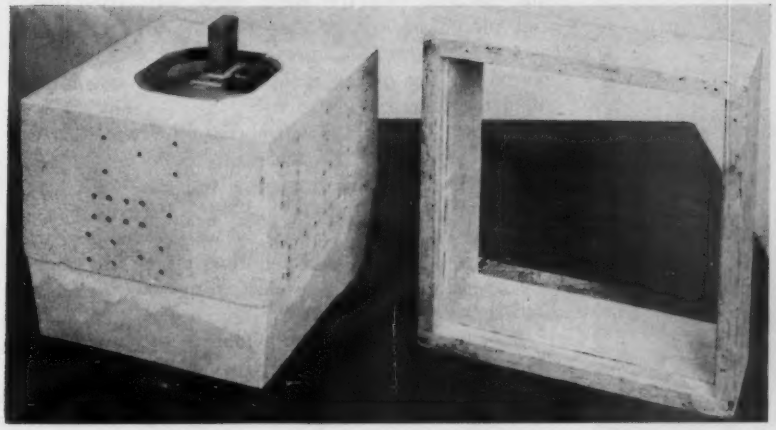

Fig. 4—Frame at right, set on top of the mold, forms the corebox for making the end sections

Fig. 5—Completed, CO_2-hardened sand mold for rigid fuze body

axis of the cylindrical fuze body casting.

A rectangular hole runs through the casting parallel to the axis. Since maintaining the required surface finish in this cavity by casting methods seemed unlikely, a length of tubing is cast-welded in the casting to form the cavity. The rectangular pieces protruding at the ends serve as core print for the tubing.

Multiple Corebox Technique—Due to the complexity of the casting and the fact that less than 50 pieces were made, it did not seem practical to machine coreboxes and patterns required by conventional molding techniques. Instead, a multiple corebox technique was developed. By using this method, the entire mold can be made from one corebox, utilizing a master pattern and removable inserts.

The multiple corebox consists of the master pattern and four additional pieces—the two end pieces and the two quadrants, which enclose one-half the circumference of the pattern. The remainder of the circumference is left open, since these inserts are not necessary in the ramming operation. Fig. 2 shows an exploded view of the multiple corebox.

Two different sand mixes were used: A 120-mesh sand with 8 per cent sodium silicate binder was used as a facing sand, and an 80-mesh sand with 4 per cent binder as a back-up sand. Both mixtures were mulled for 10 to 15 minutes prior to use.

When not being used, the sand was kept in polyethylene bags to retard the hardening action caused by the CO_2 in the atmosphere. Although there was no apparent hardening, the sand mix was kept no longer than two days after mulling.

Vibration Used—The entire ramming operation was carried out on a Syntron type VP 75 vibrating table. The vibration was found necessary to insure satisfactory packing of the pockets without resorting to hard ramming. The sand in the pockets would not draw if conventional ramming were used.

The open sides of the corebox were rammed first. A parting compound was applied and the 120-mesh sand then was sieved into the corebox. Reinforcing nails were used in the pockets. The facing sand was built up to a thickness of about ¾ in., followed by the 80-mesh sand rammed by conventional methods. All six mold pieces were rammed in this fashion.

To achieve a satisfactory draw, it was necessary to harden all the pockets, corners, and grooves of the core. A rather elaborate method was used to push a 1/16-in. diam rod into the core to various predetermined depths. A wooden template, containing locating holes and covering the open face of the core, served as a guide for the rod. These holes in the sand provided flow passages for the CO_2 gas to reach all parts of the core. The gas was introduced through an inverted rubber cup attached to the gas supply line. The cup was held against the core surface at several different locations for 15 to 20 seconds. (No attempt was made to establish the amount of gas used to harden any section of the mold.)

After ramming the open sides of the corebox, one of the quadrants forming the closed sides was removed. This exposed the master pattern and two sides of the previously rammed mold sections (see Fig. 3). These quadrants then formed the sides for ramming the next core, which was rammed and gassed as described above. The last of the four quadrants was rammed after removing the corresponding insert. Finally, the two end pieces were rammed and gassed (see Fig. 4 and 5).

Drawing of the mold pieces also was accomplished on the vibrating table. Since no alignment pins were provided, extreme care was needed to get a straight draw. The end sections were drawn first, then the four side pieces.

To prepare the mold for pouring, four ingates were hand cut in the quadrant sections to connect the ring gate with the mold cavity. A 1-in.-diam hole drilled through one side piece served as a down sprue. Similarly, a 2-in.-diam hole was drilled through the top section to serve as a riser.

The core was set in the core print of the bot-

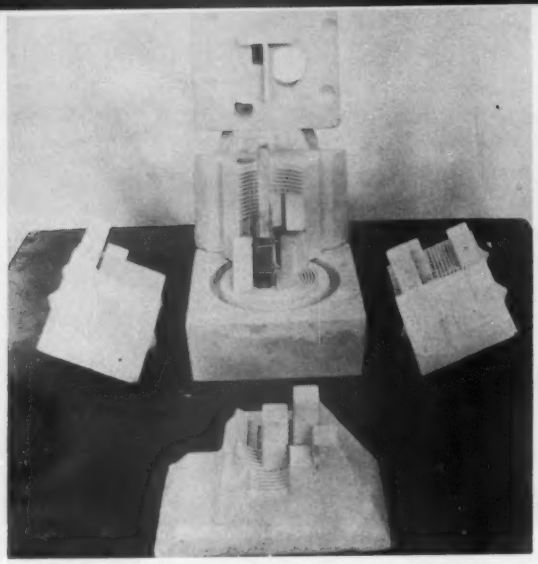

Fig. 6—Exploded view of the completed CO_2 mold

Fig. 7—The CO_2-hardened mold has been rammed in green sand and is clamped, ready for pouring

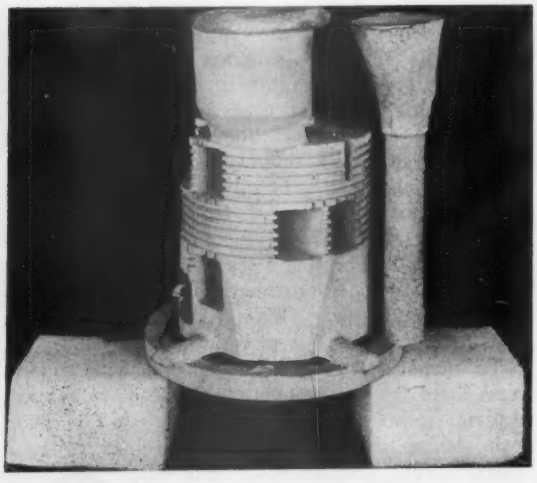

Fig. 8—Casting, showing sprue, gate, and riser

tom section, and the mold then was assembled and placed in a flask (see Fig. 6 and 7). Sand was rammed around the mold and a weight was placed on top of the mold to hold the assembled mold together.

To pour the mold, 10 lb of 356 alloy was melted in a clay-graphite crucible, using 3000 cps induction equipment. No degassing was employed and the metal was poured at 1350° F. Prior to pouring, the entire mold assembly was placed on the vibrating table and vibrated throughout the pouring operation. The finished casting with the gate and riser is shown in Fig. 8.

Suggested Changes for Quantity Production—The method devised for producing pilot quantities of the rigid fuze body permitted production of satisfactory castings. Experience with this technique, however, suggests certain changes should the methods be extended to quantity production. The multiple corebox used for this work produces core parts which are not interchangeable; consequently, the six parts that comprise a mold must be made in a specific rotation at one time. Interchangeability of the core parts can be achieved by a more precise arrangement for control of the pattern location in the corebox so that an operational procedure can be followed. This would permit labor economies since fifty or one hundred duplicate core parts could be made before time is taken to change the setup to produce the next unit required to make up the mold. The additional cost for pattern equipment could be easily absorbed by the saving of labor possible when production quantities are required. In a like manner special gassing fixtures would result in increased production of the core parts.

Chilling Necessary—The most persistent difficulty encountered in producing the rigid fuze body was associated with introduction of the rectangular tube insert. The tube was first filled with such materials as CO_2 sand, green sand, plaster investment and even pressed-in brass chills were tried. In all of these trials roughened areas would develop due to burning through the tube in those areas adjacent to the heavy sections of the casting. Other difficulties noted were distortion or warping of the tube insert.

The final method adopted was the only one which could reliably protect the tube from damage by the molten metal. The chills used were arranged to protect those areas of the tube most vulnerable to damage. Use of these chills also improved the soundness of the casting by promoting favorable thermal gradients between the casting and riser. It is recognized that no metallurgical bond exists between the tube and casting; however, the tube is securely supported in the casting by the pressure generated by thermal contraction of the surrounding metal.

Acknowledgment—The authors wish to extend their appreciation to the Diamond Ordnance Fuze Laboratories which sponsored this work and to R. R. Palmisano of that installation for his help.

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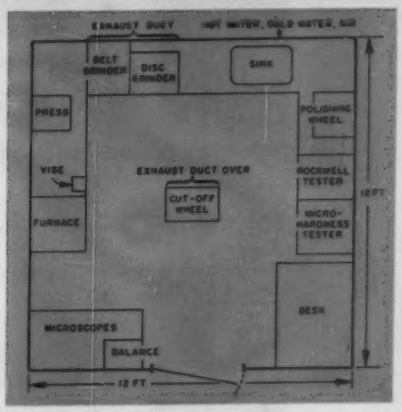
What You Need for a MINIMUM METALLURGICAL LABORATORY



Floor plan of minimum metallurgical laboratory shows how the equipment can be arranged

By JOSEPH R. DRIEAR
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Detroit

HAVE you been thinking about adding a metallurgical laboratory to your facilities? Have you done nothing about it because you weren't sure just what was needed or what it would cost? Then here's your answer. You'll find the laboratory described here is the basic minimum to satisfy the needs of your metallurgist.

This laboratory is equipped to handle some research and development work and the bulk of process troubleshooting work. If you're planning a laboratory for sand control, chemical analysis, or physical testing, then plan it as an addition to this basic laboratory.

First, select 144 sq ft of floor space in a quiet, cool portion of your plant. Utilities available at this location should include good overhead lighting, hot and cold water, drain, compressed air for drying specimens, and 110-volt ac power.

The accompanying floor plan of this minimum metallurgical laboratory gives a suggested equipment arrangement. All bench tops should be 35-36 in. high. Steel cabinet benches work very well here and provide good storage space beneath the bench top. The table for the microscope should be desk high (top 30½ in. from floor). A linoleum-top 24 x 50-in. center-drawer metal table and 45 x 34-in. steel single-pedestal desk plus two metal chairs complete the furniture requirements.

Note that the grinding operations have an exhaust system to carry off grit and dust. This system can be made self-containing.

The equipment needed in this laboratory is listed in Table I, and a basic stock of supplies is shown in Table II. Some of the equipment, such as the mounting press and polishing wheel, is specialized, and may most easily be obtained from a metallurgical supply house. Approximate prices are listed to serve as a guide.

Staff a laboratory such as this with a metallurgist and a technician, and you will develop a degree of technical knowledge about your product that you never thought possible.

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TABLE I—Equipment for Minimum Laboratory

	Approx. Cost
For Preparing Specimens for Microexamination	
Cut-off wheel (dry)—8 in. bench grinder, ¾ HP, 110 V, modified in your shop to use abrasive cut-off discs	$ 105
Specimen mounting press—for 1¼-in.-diam. mounts	202
Specimen marking tool—vibrating engraver with diamond point	16
Belt grinder—for 3-in.-wide dry belts, includes ⅓-hp motor	148
Double disc grinder (for fine abrasive papers)—1/6-hp motor with shaft projecting from each end. Discs affixed to shafts	110
Polishing Wheel—8-in.-diam., flush mounting, with 2-speed motor	185
Sink—28 x 16 x 6 in. porcelain-coated, cast iron	20
Hot plate—electric 8-in.-diam. with steplessly variable temperature	25
Rough balance—double beam, 2-kg capacity	23
Testing Equipment	
Rockwell hardness tester—With Brale indenter, 1/16 in. ball, and ⅛ in. ball and chuck	527
Knoop microhardness tester—with indenter and 100-g calibration block	1954
Potentiometer—millivolt type with manual cold junction compensator and run-up box	258
Point micrometers (screwthread)—0-1 in.	18
1-2 in.	24
Optical Equipment	
Bench metallurgical microscope—75x to 500x with movable, non-graduated stage and light source	565
Binocular microscope, low power—7x to 45x, including light source	503
Other Equipment	
Electric resistance furnace—110 V, inside dimensions 5½ x 7½ x 14 in.	180
Furnace indicating pyrometer controller—0-2000°F range, 110 V, for chromel-alumel thermocouple	230
Dust remover—500 cfm with bag-type filters	250
Total	$3343

TABLE II—Laboratory Supplies

Number		Approx. Cost
4	Chromel-alumel thermocouples 20-gage wire with double-bore insulators	$16
2	5-lb jars, green bakelite specimen mounting powder	10
1	Extra 8-in. wheel for polisher	19
1	1-lb bottle, 0.3 micron alumina abrasive	15
1	1-lb bottle, 0.1 micron alumina abrasive	15
12	8-in. microcloth polishing cloths	8
12	8-in. silk polishing cloths	12
100	8-in. emery polishing discs (000 grit)	8
100	8-in. emery polishing discs (00 grit)	8
100	8-in. emery polishing discs (0 grit)	8
100	8-in. emery polishing discs (1 grit)	8
36	Abrasive alumina belts (120 grit)	30
24	8¼-in.-diam resin-bonded cut-off wheels, 1/32 in. thick (70 grit)	56
1	Hand hacksaw	1
1	3½ x 4-in. vise	11
2	Protective face shields	10
1	6-lb bottle hydrochloric acid, reagent grade	2.34
1	7-lb bottle nitric acid, reagent grade	2.73
1	9-lb bottle sulfuric acid, reagent grade	2.70
5 lb	Soda ash, technical grade (for acid spills)	1.40
12	400-ml glass beakers	4.08
5 lb	Methyl alcohol (absolute) (for metal-etching solutions)	2.95
1	Package "Q"-tip swabs	.75
1	Glass thermometer, 0-220° F	1.45
1	Glass thermometer, 20-500° F	1.90
Total		$253.30

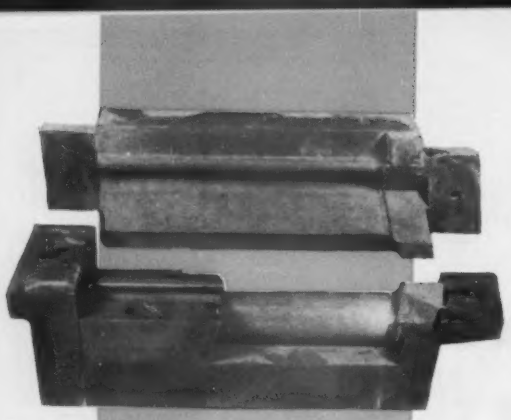

Fig. 1 — "Blow-in" corebox with plastic drier. Plastic cope will be matched with metal drag for blow, then will be used as core drier

CAST EPOXY

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THE economic advantages of an inexpensive drier for contoured sand cores—that is, cores without flat supporting surfaces—are readily apparent to foundry supervisors responsible for dielectric oven operation. These drying ovens represent a large capital expenditure and require efficient operating techniques to justify the investment fully. In operation, however, they show sizable cost savings.

Until recently, this equipment has been used largely to bake cores with convenient flat surfaces. Baking small to medium quantities of irregularly surfaced cores was not considered practical until Lebanon Steel Foundry recognized the need for increased efficiency of its dielectric facilities and developed materials and procedures for fabrication of inexpensive driers.

Dielectric ovens to bake cores are available in a variety of sizes. Their electrical output averages about 20 kw per half-ton per hour of production, and they normally operate at a frequency of about 15 megacycles. Dielectric ovens now in use operate at up to 75,000 volts.

Cores going through a dielectric oven must have a support, much as those in conventional ovens. Core supports used in dielectric baking units must, however, "have both thermal and electrical properties which suit the application. One or the other of these characteristics is present in many materials, but few have both. The electrical characteristics *must* approximate quite closely those of the sand mix being baked."[1] Metal core driers or core plates do not meet this condition. Because they remain "cold" in the dielectric field, steam generated from the core condenses on the cooler metal, and the core in contact with the metal remains or becomes soggy (not dried).

Transite or Marinite core plates readily solve the problem of core plates for dielectric ovens, but only partially solve the problem of core driers, particularly when cores have not flat surface. Sand driers of high resin content are satisfactory for short-run jobs, but are fragile and cannot stand the rough treatment normally associated with foundry usage. Compression-molded, thermosetting plastic fiberglass core driers solve the problem for very high production items, but the high cost of the metal molds for the compression molding of these driers greatly limits their use.

Since many contoured sand cores do not fall within the practical range of compression molded driers, an attempt was made to solve this problem by casting a drier with existing plastic material. Actual usage proved unsatisfactory, however, for general deterioration and eventual destruction of the plastic drier occurs before ten passes through a dielectric oven. This is particularly true for larger ovens.

Consequently, there was a great need for a material castable into a cheaply constructed master mold, one which would provide adequately the aforementioned thermal and dielectric properties. It also had to be economically justified for the finished part and capable of being readily formed to shape. Such a material has been developed.

Table I shows a typical comparison of the cost of this new casting method vs. that of compression molding for a drier weighing approximately 1.5 lb.

On the basis of these cost figures, assuming that the physical properties of the driers are equal, one would have to fabricate more than 320 driers by compression molding to justify that technique economically.

Plastic driers used in conjunction with making

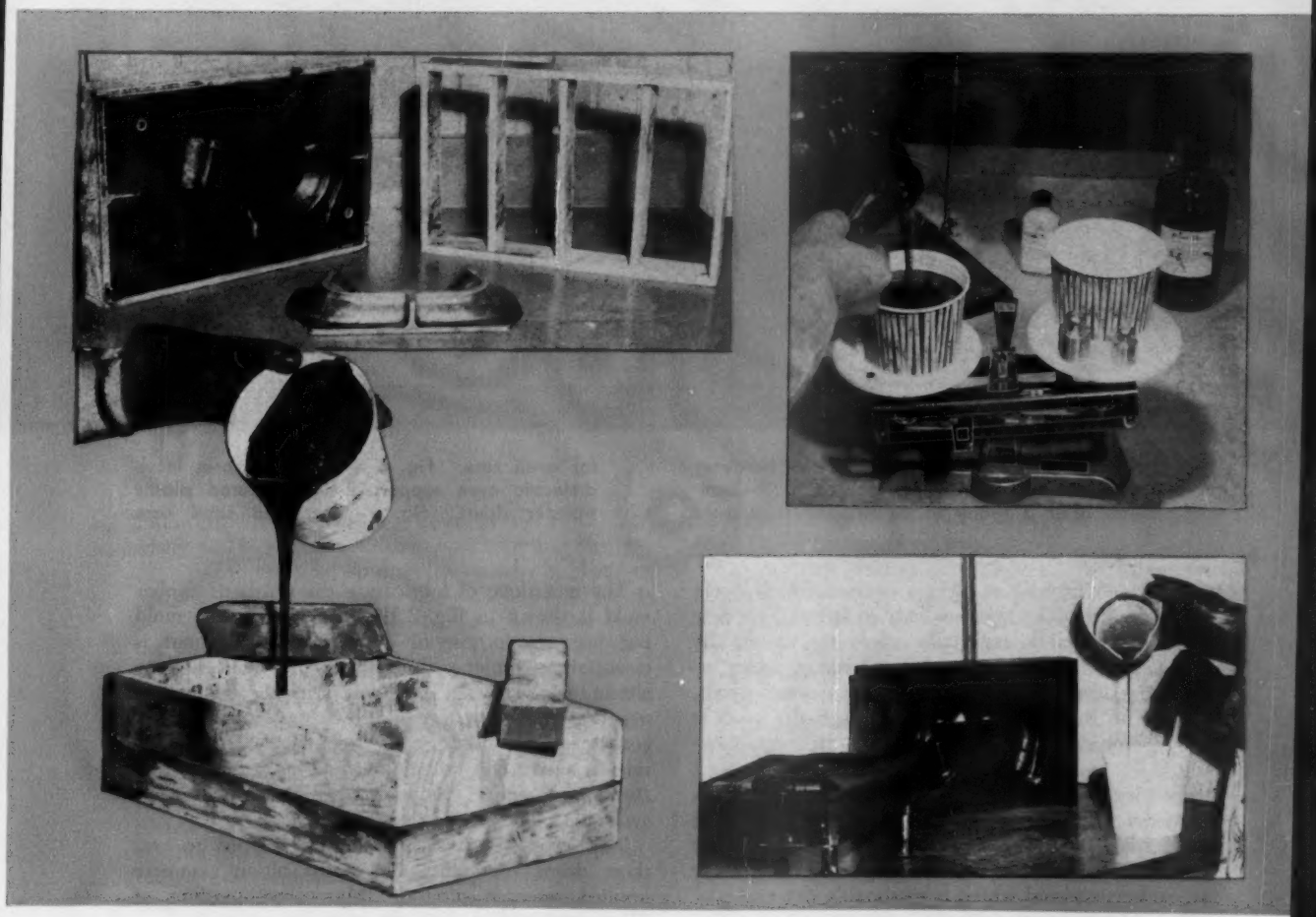
TABLE I—Comparison of Drier Costs

	Cast Drier	Compression Molded Drier
Master mold	$50.00	$850.00
Amortization of master mold (over 50 driers)	1.00	17.00
Material, labor, and overhead for drier construction, each	4.00	1.50
Total cost per drier	$ 5.00	$ 18.50

CORE DRIERS

for Dielectric Ovens

Inexpensive cast epoxy driers were developed for use with contoured sand cores cured in dielectric ovens. They provide required thermal and dielectric properties and are made easily and economically



MAKING RUBBER MOLD: Fig. 2 (top left)—Synthetic rubber is cast in a reinforcing wood frame (right) positioned over completed half of mold (left). Fig. 3 (top right)—Ingredients are mixed thoroughly. Fig. 4 (lower left—Mix is poured over master model. Fig. 5 (at lower right)—Completed mold is ready for use

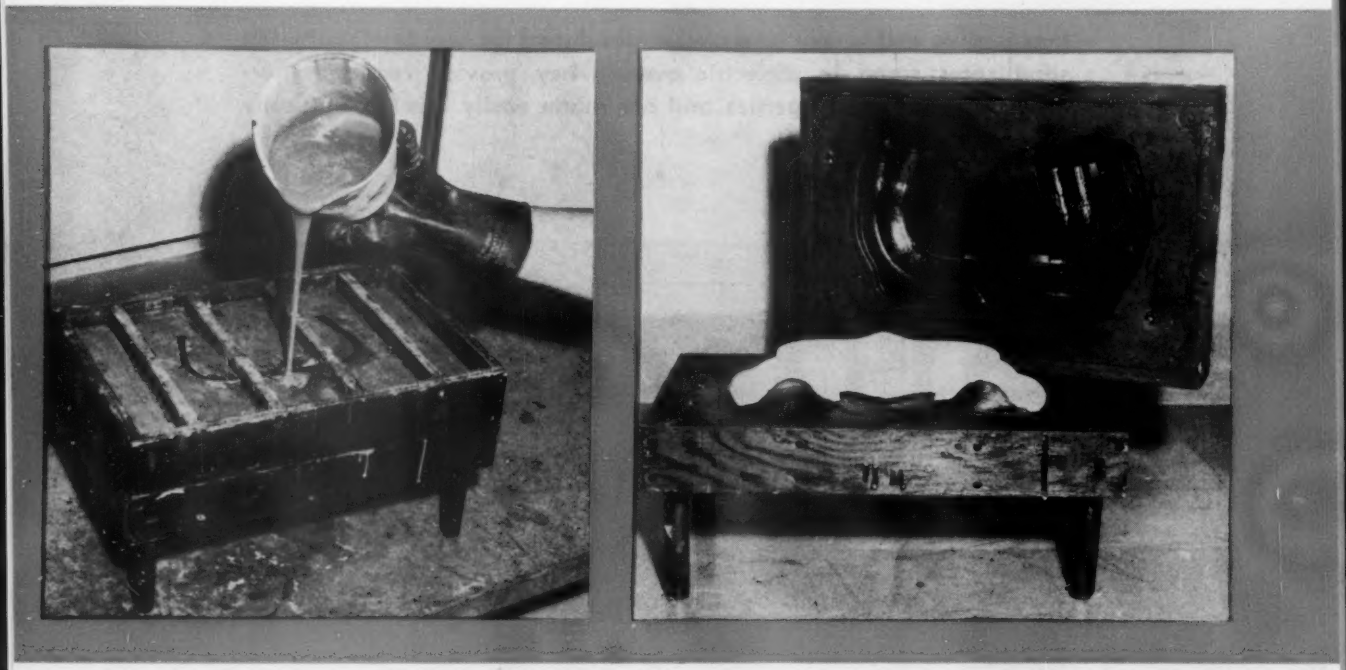
and drying cores are either "transfer" or "blow-in" core driers. With a transfer drier, the hand-rammed or jolt-squeezed formed or blown cores are transferred from the corebox to a drier with contours which match the *bench master*. This transfer drier provides a uniform supporting surface for the green sand core.

In the "blow-in" method of producing cores, one half of the corebox is made of metal or plastic and the other (blow-in drier) half of plastic. When the corebox is parted, the core is left in the plastic drier half, in which it is run through the dielectric oven, and another plastic drier is matched with the permanent half to form a corebox for the next "blow-in." Fig. 1 shows a blow-in drier. The new casting material is especially suited for use in the "blow-in" process because the number of driers required is limited to oven capacity. In other words, as soon as the drier has passed through the oven, it can be returned to the machine for the next blowing.

Fabrication of the Cast Drier—In every instance, a model of the core drier is required to form the mold for reproducing the drier. The original master model may be of wood, metal, plastic, plaster, or any other material which is reasonably dry and provides satisfactory reproductive surfaces.

Master molds made from the master model have been formed successfully from several kinds of material. The synthetic rubbers work well for molds requiring reliefs. This material will produce core driers satisfactorily in quantity (50 driers), provided that the usual handling and size limitations are recognized. A second mold material is a plastic casting resin.

The casting resins usually are easier to use because they require no structural reinforcement and eliminate the need to use and stock additional kinds of material. Plaster molds have a limited application. They are satisfactory when the model offers relatively gentle draws and only a few driers are to be produced. The handling and use of this material are generally well known throughout the industry and will not be discussed here in detail.



Left to right: Fig. 6—Base resin and hardener are mixed and poured into mold. Fig. 7—Semi-cured drier is ready to be stripped from mold for oven cure. Fig. 8—Dried sand cores leave dielectric oven supported by contoured plastic transfer driers. Fig. 9—Drier and sand core

The technique of fabricating the synthetic rubber mold is shown in Fig. 2 through 5. After the mold has been made, use of a proper release agent is essential to prolong the life of the mold and to eliminate rejects. An especially selected semipermanent release agent followed by sprayed or brushed coats between castings are required. These same release agents can be employed to make molds from the master model for use with either plastic or synthetic rubber casting materials.

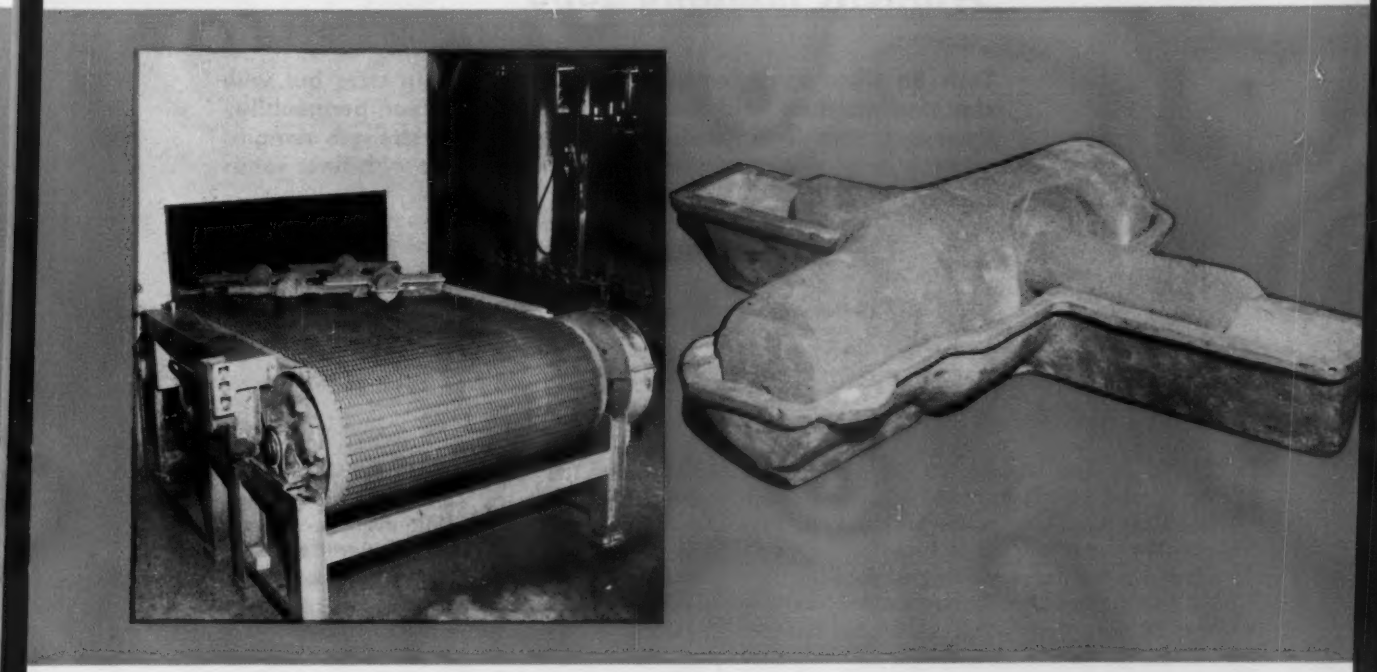
The epoxy plastic compound developed to cast these driers represents the results of an extensive applied research program. Many combinations of fillers, resins, and catalysts were investigated.

Predetermined amounts by weight of base resin and hardener are mixed and cast into the mold (previously gated and coated with release) and allowed to gel. After gelation (30-90 minutes de-

pending on volume of the casting), the casting is removed from the mold and cured in an oven.

The ideal cure schedule requires elevating the oven temperature by steps to 250° F for 1 hour and then to 320° F for 1 hour. The casting may be cured in a plastic mold, but to prevent deterioration of the mold it must be removed from the rubber mold before the 250° F level is reached. Of course, many variations are possible in the fabrication of core driers, and instructions are available in technical literature. Fig. 6 through 9 show production and use of a typical drier.

Physical characteristics of the plastic include the following: 1. Pot life—½ hour at 77° F. 2. Viscosity at 77° F—base, 490,000 cps; base and hardener, 90,000 cps. 3. Pourability—good, bubble-free casting. 4. Heat distortion—122° C, 264 psi. 5. Hardness—95 Rockwell M scale. 6. Co-efficient of thermal expansion—30 x 10^{-6}. 7. Tensile strength—7800 psi. 8. Compressive strength—18,000 psi. 9. Compressive yield, 14,000 psi. 10. Flexural, 14,600 psi. 11. Izod impact, 0.60. 12. Specific gravity, 2.07. 13. Weight, 0.078 lb per cu in. 14. Shrinkage, 0.0025 in. per in.



Advantages of Cast Plastic Core Driers—The inherent benefits of the recommended procedure for making molds and casting driers contribute substantially to the economics of the plastic core drier, particularly in this instance. The same procedures that have been accepted practice in foundries for years are used to cast these driers. The difference is that plastic is used for the castings instead of metal and that a rubber or plastic is used for the molds instead of sand. Normally, one run through the recommended fabrication of a mold and casting equips a technician to proceed with any future job without undue difficulty.

The cost of producing a core drier of the type shown in Fig. 9, on the basis of a total of 50, was $4.20.

Cost of the master core drier pattern is not included in this tabulation. This core drier represents a typical example, but a larger drier would be cast at a slight increase in cost. The procedure, labor, and time cycle would be approximately the same; the added cost would, of course, be for additional material required for the larger drier. The mold cost can be further reduced if the mold is made from plastic instead of rubber.

One of the greatest advantages of the cast drier is that it is ready for use without modification. For instance, there is no loss of time in preheating the drier, whereas metal driers often require preheating. Further insulation is not required since the plastic insulates itself to prevent arcing.

Cast driers are dimensionally stable and exhibit excellent shelf life, regardless of the humidity and heat conditions of the storage facilities. They are very durable and stand up well under repeated use, even with the rough treatment normally associated with foundry handling. Also, weight of the plastic drier is considerably lower than that of a comparable metal drier, a factor which pays off in increased efficiency of coreroom personnel.

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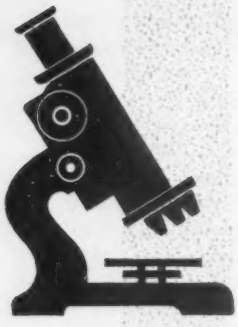

EFFECT OF GRAIN SIZE

On Physical Properties of Synthetic Molding Sand

Tests on silica sands with various average grain sizes but with clay and moisture held constant indicate that green permeability decreases with finer sands, green compressive strength remains constant, and dry compressive strength increases with finer sands

By CARL E. SCHUBERT
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RECENTLY three students (R. M. Hall, E. A. Ranta, and M. H. Raymond) in the foundry metal casting course at the University of Illinois and the writer decided to investigate some of the physical properties of molding sand.

After much discussion, it was decided that the objective of our investigation would be to study and determine the effect of various grain sizes of silica sand on the green permeability, and green and dry compressive strengths of synthetic molding sands when the clay and moisture in the sands are held constant.

Seven different sizes of silica sand were obtained together with southern bentonite clay. The AFS fineness number of the seven silica sands ranged from 37.3 to 96.5 average grain sizes. In determining the fineness numbers of these sands it was found that all had more than 75% of their deposits on three adjacent screens. These data have been deleted from this work as our data showed that this information did not affect our results and was of general interest only.

In most cases, five samples of sand having various moisture contents and 4 per cent of clay together with 96 per cent silica sand were prepared in a sand muller, using the standard AFS method of procedure. The three students were responsible for performing all mixing and testing of the seven samples of molding sand during their spare time in this semester. They also were responsible for making the tables of results and the graphs. As the work proceeded it was found that they could not finish the special tests that were performed later to complete the work. The writer, therefore, performed the tests on the two special prepared sands and the two sands selected to be tested with 6 per cent southern bentonite.

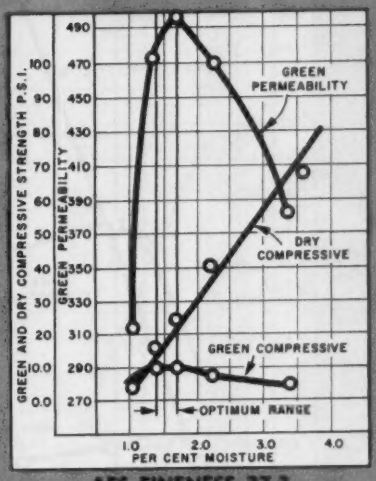
Moisture Control Difficult—The greatest difficulty in collecting the data was encountered in the attempt to keep the moisture contents constant from one series of tests to the next. Examination of the test data shows that the maximum variation in moisture contents was 0.4 per cent throughout all of the tests.

As the test data show, some of the moisture contents of the sands were on the dry side while others were approximately at optimum moisture contents. Still others were on the wet side of optimum.

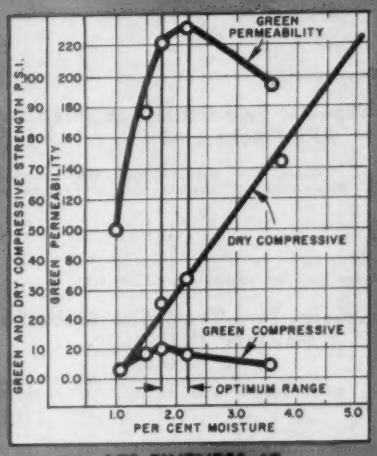
If one accepts the definition of the optimum moisture content of a molding sand to be that content which produces the maximum green permeability together with the maximum green bond strength of a molding sand, and if there is a range of moisture content where the sum of both of these physical properties are at their maximum values, then the work showed some interesting results.

The tests show that the green permeability of molding sand increases as more moisture is added, beginning from the dry side, until a maximum value is reached, after which the permeability declines. (See Tables I to XI.) These results agree with the conception that each particle of clay

How Moisture, Clay, and Grain Size Affect Properties



AFS FINENESS 37.3



AFS FINENESS 49

TABLE I—Silica Sand AFS Fineness 37.3

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.1	313	4.4	3.1
1.4	472	10.2	13.7
1.7	497	10.4	23.7
2.3	470	7.8	40.1
3.4	383	4.8	68.0

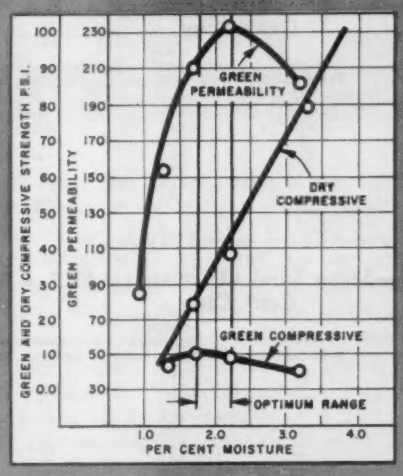
Optimum moisture content 1.4-1.7 per cent

TABLE II—Silica Sand AFS Fineness 49

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.05	99	1.7	*
1.5	177	7.4	8.0
1.8	223	10.4	25.0
2.2	232	8.0	35.0
3.6	195	4.5	72.0

*Too weak to test.

Optimum moisture content 1.8-2.2 per cent



AFS FINENESS 51

TABLE III—Silica Sand AFS Fineness 51

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
0.9	85	*	*
1.3	153	7.4	6.1
1.7	210	10.4	24.3
2.2	232	9.1	39.0
3.2	205	5.2	79.0

*Too weak to test.

Optimum moisture content 1.7-2.2 per cent

TABLE IV—Silica Sand AFS Fineness 60.7

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.2	90	4.4	4.0
1.5	135	10.3	12.0
1.85	156	9.9	30.0
2.3	161	7.3	40.0
3.8	137	4.5	83.0

Optimum moisture content 1.85-2.3 per cent

TABLE V—Silica Sand AFS Fineness 64.9

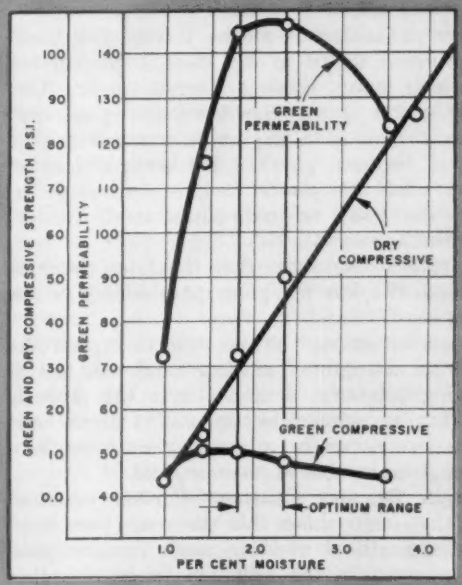
% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.0	72	2.8	2.5
1.45	116	10.1	14.0
1.85	145	9.6	32.0
2.4	146	7.6	50.0
3.6	123	4.7	86.0

Optimum moisture content 1.85-2.4 per cent

TABLE VI—Silica Sand AFS Fineness 82.7

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.2	47	3.3	3.9
1.6	76	10.2	16.6
2.0	90	9.5	44.3
2.4	88	6.9	62.0
3.6	76	4.4	108.6

Optimum moisture content 2.0-2.4 per cent



AFS FINENESS 64.9

TABLE VII—Silica Sand AFS Fineness 96.5

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.0	31	2.0	1.5
1.4	49	7.8	10.6
1.8	68	10.2	38.3
2.2	73	8.9	61.2
3.5	65	5.0	136.0

Optimum moisture content 1.8-2.2 per cent

TABLE VIII—Special Two-Grain Size Silica Sand AFS Fineness 40.6

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.2	300	4.5	4.3
1.5	400	10.1	14.0
2.0	425	8.7	27.5
2.3	405	6.5	40.5
3.4	350	3.9	72.0

Optimum moisture content 1.5-2.3 per cent

TABLE IX—Special Two-Grain Size Silica Sand Fineness 71.1

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.5	95	9.8	14.1
1.9	109	10.3	31.3
2.5	109	7.4	59.1

Optimum moisture content 1.9-2.5 per cent

TABLE X—Silica Sand AFS Fineness 60.7, 6 Per Cent Clay

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.8	74.5	17.5	*
2.0	108	18.1	28.0
2.2	115	18.7	36.0
2.4	123	17.7	45.8
2.6	135	16.0	59.0
3.0	142	12.4	70.1
3.4	136	11.5	78.6
4.9	117	7.8	145

*Too weak to test.

Optimum moisture content 2.6-3.0 per cent

TABLE XI—Silica Sand AFS Fineness 82.7, 6 Per Cent Clay

% Moisture	Green Permeability	Green Compressive Strength, psi	Dry Compressive Strength, psi
1.8	47	14.9	14.0
2.0	56	17.7	22.0
2.2	71	18.1	40.5
2.5	80	16.4	52.3
2.7	83	15.5	59.6
3.0	84	13.3	68.3
3.6	78	10.0	89.6
4.3	75	8.9	139.0

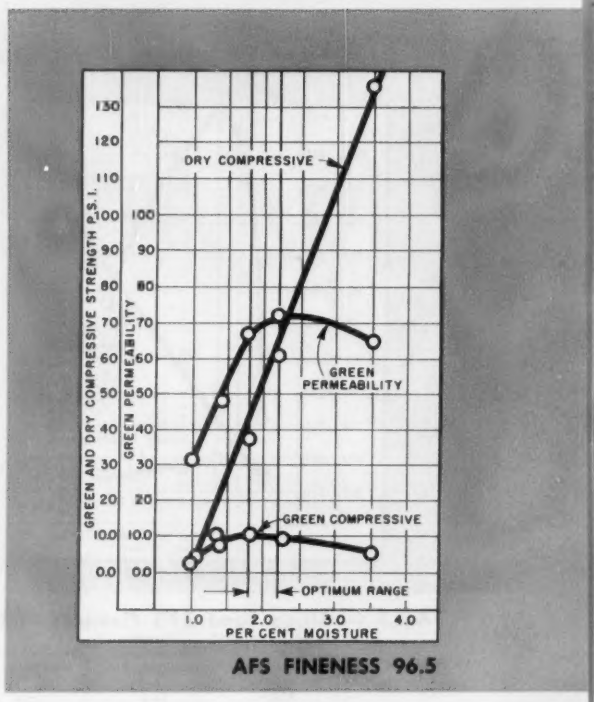
Optimum moisture content 2.7-3.0 per cent

is somewhat analogous to the leaves of a book. As moisture is added to dry clay, it goes in between these leaves, causing them to swell. This swelling action of the clay bond continues until the clay cannot hold any more moisture within itself and becomes plastic. Further additions of moisture after this plastic state is reached go in between the grains or voids of the sand, thus reducing the permeability.

The results also show that the finer the base silica sand, the less the green permeability of the molding sand.

The above concept is also said to explain the green bond strength of molding sand. In fact, if a bonding substance does not have the property of swelling, no appreciable amount of green bond strength can occur in a molding sand, at least not enough to be able to produce molds.

Strength Remains Constant—Further examination of the results shows that the green bond compressive strength of molding sands remains practically constant in the optimum range regardless of the grain size or distribution of the silica sand.



That is, a fine-grain-size silica sand does not produce greater green bond strength in a molding sand, if the optimum moisture range, clay, and ramming force are held constant. The maximum variation was approximately 0.6 psi with the finer sands.

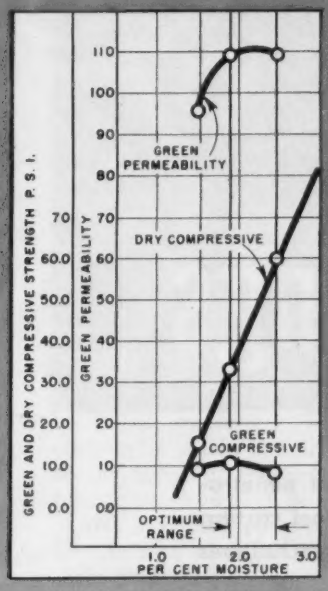
It is true that small-grain-size molding sands pack together tighter under a given force than do larger grain sizes; one might reason, therefore, that a molding sand of fine-grain-size would be stronger in green bond strength than a coarser sand. This reasoning does not take into account the important fact that there is more surface area for a bonding material to cover in the case of fine-grain silica sands.

Consequently, although those sands might pack together more closely, thus reducing the permeability, they will not necessarily be stronger, because the clay has more surface area to bind. In our test data these two factors seem to balance each other so that the green bond strength of various grain size silica sands remains practically constant if the ramming force, percentage of moisture, and clay bond are held constant.

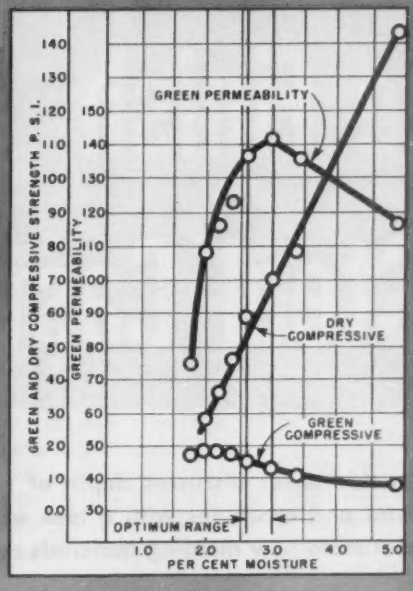
To further substantiate these results, two special silica sands—a 40 AFS fineness and a 70 AFS fineness—were prepared. In both these special sands were two grain size silica sands. Most of the deposit was on one screen and the remainder on the other screen. This circumstance accounts for the fact that the 70-mesh special silica sand has only three points on the graph instead of five. As can be seen, the results checked the preceding data and show that distribution of the grains does not have any appreciable effect on the results (see Table VIII and IX).

In addition to these two special prepared silica

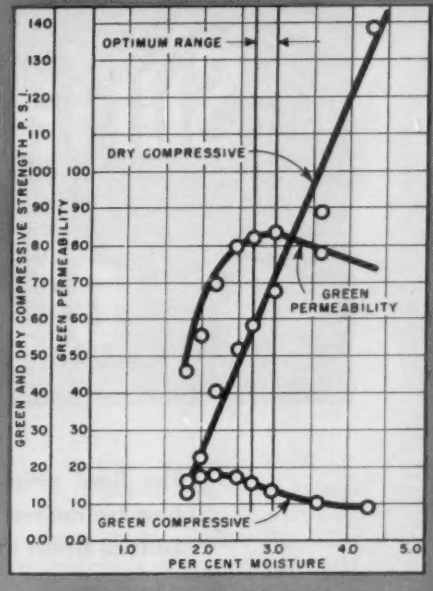
How Moisture, Clay, and Grain Size Affect Properties



AFS FINENESS 71.1



AFS FINENESS 60.7



AFS FINENESS 82.7

sands, it was decided to try a different percentage of clay. Two sands were prepared as before with 6 per cent clay and various moisture contents. This time eight different moisture contents were used in order to have more points and to establish a truer curve.

Again, the results show that although the green strength increased as expected, the strengths were approximately the same for 6 per cent clay in the optimum range of 2.4 to 2.7 per cent moisture (see Tables X and XI). The green permeability of these two sands, however, was not reduced consistently by the addition of 2 per cent more clay. The 60.7 AFS fineness sand declined 11.2 per cent in green permeability at optimum range while the 82.7 AFS fineness sand dropped only 6.7 per cent. The test results do show, however, that the addition of more clay to a molding sand reduces the permeability of the sand.

Moisture Additions—Examination of the dry compression strength test data shows that as the moisture is added to molding sand in the form of temper moisture it increases the dry strength of the molding sand. This is according to the so-called "wedge theory" of molding sand. This theory states that as temper moisture is added to molding sands, small wedges are formed in the clay bond and at the grain boundaries of silica sand. The more moisture of temper added, the greater the number of wedges formed.

When this moisture is driven off at approximately 220-230° F, as is done in the dry compression strength test, these wedges remain in the molding sand. They act to prevent slippage at the grain boundaries of the silica sand grains and throughout the clay particles under static loads. Thus, the more moisture added to molding sand, the greater the dry strength of the sand becomes.

It would be difficult to choose very high moisture contents to determine if there is a maximum moisture content where the dry strength declines. At high moisture contents the clay bond would tend to stick to the plows, side walls, and wheels of the muller, thereby reducing the amount of clay in the molding sand and also the dry strength. So, within the limits of good mixing procedure, no reduction in dry strength was noted. In fact, the dry compressive strength of each sand tested increased almost as a straight-line function of the moisture added.

The test results show that as the grain size of the silica sand is reduced in size, the dry compressive strength at 3.6 to 3.8 per cent moisture increased as the silica sand became finer. The lowest dry compressive strength occurred where 37.3 mesh size was used, while the highest occurred when 96.5 grain size was used.

Perhaps the most interesting fact that this work demonstrated was that the various grain sizes of silica sands used did not, as expected, increase the green bond strength of the sand to any appreciable amount in the so-called optimum moisture content range of the sands tested. In addition, the results of the two specially prepared silica sands substantiated these test data and showed that distribution of the grains of silica sand has no effect on the ability of the clay bond to produce green strength. Also, that when larger amounts of clay are used, the green bond increases in the optimum moisture range, but the green bond was the same in this range for the two different grain sizes of the base silica sands tested.

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Surface Finish of Steel Castings

The final article in this series discusses depth of sand penetration by molten metal and concludes with a look at steel casting surface finish in relation to new molding materials and techniques

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DEPTH of molten metal penetration through sand pores controls the amount of burnt-on sand that has to be cleaned from a casting. It may be assumed that molten metal will flow into facing sand until the tip of the advancing probe solidifies—that is, to a depth where sand temperature is approximately equal to the solidification point of the metal. In other words, the limit of penetration is defined by the location in the sand of the isothermal corresponding to the solidification temperature of the metal. Location of this isothermal is determined entirely by thermal factors such as thermal diffusivity of the sand and temperature of the metal-mold interface.

As mentioned earlier, temperatures at the metal-mold interface have been measured[11] and give values in line with theoretical expectations. No direct determinations have been made of the thermal diffusivity of molding sands, but, if it is assumed that the density and specific heat of molding sands do not vary appreciably from their room temperature values, values of diffusivity may be obtained from thermal conductivity measurements.

Thermal Conductivity—The author[22] measured the thermal conductivities of various compacted sands up to temperatures of 2910° F, and a typical series of results is illustrated in Fig. 24. The values obtained show good agreement with those of other workers[23,24] who previously had made determinations up to temperatures of 2280° F. The results show that the apparent thermal conductivity of compacted silica sand increases with increase of sand grain size and markedly increases with increase of temperature above about 1110-1290° F. This latter increase is caused by heat transfer within the sand by radiation through the grains, silica being transparent to infrared, and by radiation from grain to grain across the pores.

Using these values of thermal conductivity it is possible to obtain by a comparatively simple mathematical treatment[6] an indication of how physical conditions of sand and metal influence the depth of metal penetration. For example, it may be shown how in agreement with experimental work, the depth of penetration increases with sand grain size. In addition, since both air permeability and sintering point increase with sand grain size, the often observed correlation between the depth of penetration and these properties is explained readily. The frequently observed increase of depth of penetration with superheat of the metal may also be explained readily.

It is very encouraging that the depths of penetration calculated by use of mathematics are in good agreement with those observed in practice and those measured experimentally by other workers. The extensive work of Beeley and Protheroe[3] fits in very well with these theoretical calculations. Thus Fig. 25 shows their results for the variation of depth of penetration with casting temperature for a small-

section casting which explain the slight penetration observed.

Bearing in mind that coarse sand has a conductivity greater than twice that of finer sand, it is interesting to observe that penetration does not commence with the coarse sand until a substantially higher temperature. With the coarse sand, chilling of the metal at the interface occurs much more readily without remelting, but, when remelting does take place, a greater depth of sand will have been heated to above the melting point so that greater depths of penetration will occur. It may be seen that this was observed experimentally.

Secondary Penetration—When penetration has taken place on the attainment of the penetrating pressure, the sand still continues to heat up in depth, particularly since the penetrated sand has a much higher thermal conductivity. Where thermal conditions are severe, as in cores and re-entrant portions of molds, it is conceivable that remelting of the metal in the penetrated sand occurs, and further or secondary[7] penetration occurs. The rate of this secondary penetration is slow and depends on the rate of advancement of the solidification point isothermal.

New Materials and Techniques—During the last decade, the foundry industry has experienced a large influx of new molding materials and techniques. Consequently, the foundryman today is confronted with a wide range of methods for producing both molds and cores. Consideration is given in this section to the surface finish produced by these new techniques and by the older and well established methods.

Investment Molding—For small castings of a few pounds and less, there is little to compete with the high surface finish and dimensional accuracy of the investment casting process. This process can produce a surface finish directly comparable to that produced by a metal die. Where the high costs of the process can be justified, it is finding increasing application for castings of intricate shape and close dimensional tolerances produced in alloys difficult to machine.

For plain carbon and alloy steels, it generally is considered essential to use a duplex investment in which the pattern is covered by a primary coating of a fine refractory material which then is allowed to dry and afterward is backed up by a coarser investment mixture. Composition of the refractory in the primary coating is of considerable importance since many refractories, like silica and zircon, can react with high-alloy steels containing reactive elements such as titanium.

Perhaps the most widely used materials for primary coatings are those based on alumina and magnesia of very fine grading, all through 100 mesh with a substantial proportion less than 300 mesh. Investment molds with these very fine facings produce extremely smooth surface, and intergranular penetration virtually never occurs although other surface defects, such as scabs, rippling, etc., do occur.

Shell Molding—For castings up to approximately 50 lb, the shell molding process is widely used for the production of smooth-surfaced and dimensionally accurate castings and has made moderate inroads into the green sand field. The fine surface finish obtainable is due primarily to the use of sands of fineness on the order of 150.

In addition, the high content of volatile resin in the mold must counteract the metallostatic pressure on casting and therefore reduce the danger of penetration. It is essential, however, to obtain good compaction of the shell mold; otherwise, the use of the fine sand can be nullified, and burn-on can occur. Drop heights for the sand resin mix of at least 12 in. generally are recommended but a height of 24 in. with a 4-in. minimum depth of mix over the pattern face recently was recommended by Braybrook and Waters[25]. Even with these drop heights, it must be emphasized that the degree of compaction of shell molds is low compared with that of green sand molding.

The shell molding process frequently results in a poor surface finish in low-carbon steels. A typical example of the surface finish, aptly described as "orange-peel," is shown in Fig. 26. It has been suggested that this surface is the result of mold breakdowns causing gross penetration, as often is

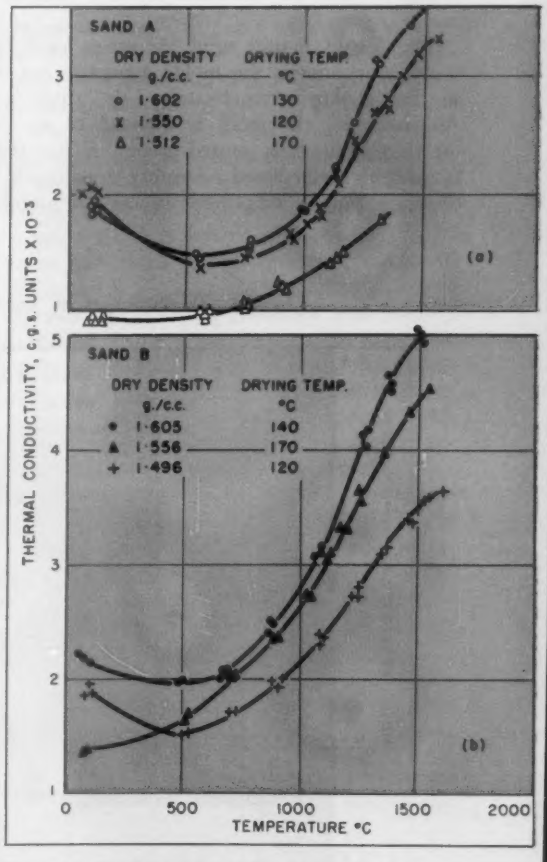


Fig. 24—Variation in thermal conductivity of sands at different temperatures. Sand A is an AFS 93 sand; Sand B is AFS 35

found in manganese steel castings.

This possibility is most unlikely, however, since the orange-peel area on shell-molded castings consists entirely of craters, not of raised areas. Evidence to date suggests that the defect is due to a metal-mold reaction, possibly resulting from the intimate contact of the resin at the mold surface with oxides on the metal surface, thereby leading to the violent evolution of carbon monoxide.

With alloy steels, shell molding invariably results in a surface finish superior to that obtained with green sand; in addition, the pitted type of surface known as "measles" that occurs in high-chromium steels cast into green sand is absent[26].

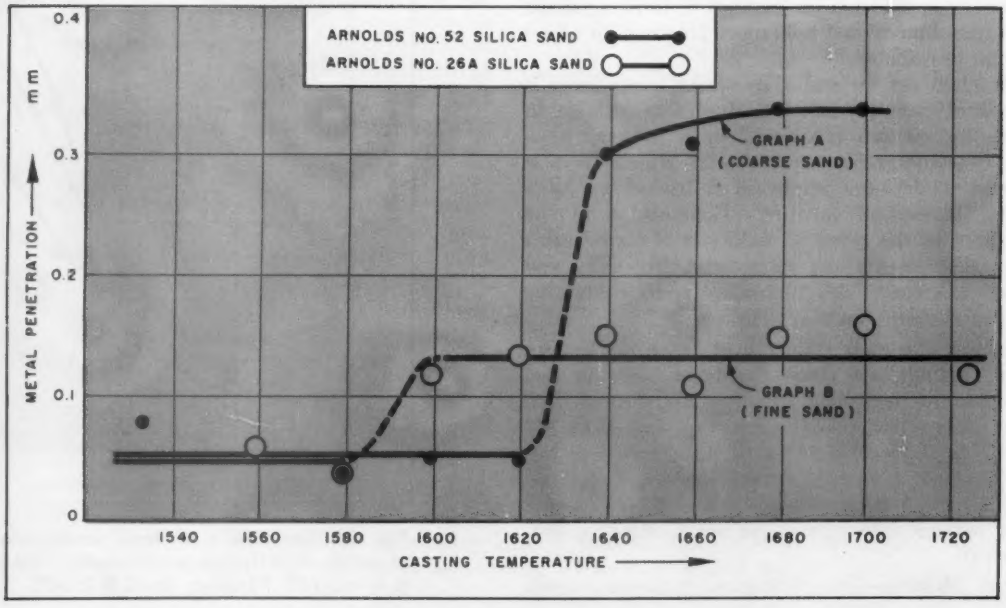
Green Sand Molding—Within recent years, there has been a marked tendency to produce castings of greater weight and section thickness in green sand. This trend is a natural consequence of the extensive research carried out with synthetic sand mixes and is, of course, of considerable appeal to the foundryman since green sand molding is less expensive than dry sand molding and also leads to faster production. Briggs[27] has described the experience of American foundries which have made up to 38 tons and up to 36-in. section thickness in green sand. The maximum section thickness probably is the limiting factor. The very heavy castings of over 25 tons produced in green sand generally were frame castings of moderate sections—less than 10 in.

The use of a unit sand for green sand castings is not uncommon; the molds generally are torched so that a skin approximately 1 in. thick is dried. Alternatively, the mold is allowed to air dry or, for thin sections, is poured green. When the mold is torched, water-based refractory dressings of zircon or silica can be employed; in certain foundries in Great Britain and Europe, proprietary inflammable mold dressings based on zircon are used for green sand molds which, apart from improving surface finish, skin-dry the sand on ignition. Inflammable dressings based on silica are not recommended since dangerous dust clouds may be produced on spraying the mold. Alternatively, and as a general rule for heavy-section castings, a facing sand with a permeability of less than 100 is used, these low permeabilities frequently being achieved by the incorporation of fine flours into the sand. The backing generally is system sand of low clay content and of permeability in the region of 200.

From the point of view of surface finish, the use of a facing sand with 10 to 15 per cent silica flour or other fine refractory filler is preferable. The casting surface generally can not be distinguished from that obtained in dry sand practice. Since such facing sands of necessity are of high green strength and generally poor flowability, every effort must be made to ensure good compaction of the sand. For this reason, certain foundries employ a unit sand which can be compacted to a much better degree by the use of a sandslinger.

High-Pressure Molding—A recent development that should expand the use of green sand molding for high-quality castings is high-pressure molding. This process consists essentially of producing a dense, firm mold by squeezing a highly flowable, fine sand under a substantial pressure around the pattern; its immediate advantages are the production of a fine finish and close dimensional accuracy, particularly on small, intricate castings. The molding sand, located between the pattern and a flexible diaphragm which follows approximately the contour of the pattern, is squeezed to a very high density by the application of air pressure to the

Fig. 25—Variation of depth of penetration with casting temperature



upper surface of the diaphragm. The process requires the use of special sand mixes. They generally are fine sands, and most have low moisture contents to insure good flowability and high green strength.

Rapid-Hardening Oils—Another recent advance in mold and core production has been the development of cold setting and rapid-hardening oils. These oils, generally of the linseed type, contain metallic driers such as cobalt and lead naphthanate to accelerate oxidation and polymerization. The hardening rate can be increased even further by adding accelerating agents such as organic and inorganic peroxides.

Sands bonded with such oils harden in the corebox or around the pattern and thus reduce distortion and the need for irons or strengtheners. In addition, these sands of very high flowability pack well to form a dense mold surface and result in a good casting finish. Certain foundries have utilized such sands as facings for mold manufacture with a clay-bonded backing.

CO_2 Process—The carbon dioxide process is being employed to an increasing extent for the production of both mold and cores for steel castings. The surface finish of steel castings produced by the process is, in many ways, the converse of that obtained with green and dry sand practice. On sections less than 1 in. thick, the surface finish generally is not good, but with increasing casting section, the finish improves noticeably. This behavior appears to be due primarily to the formation of an $Na_2O{\cdot}FeO{\cdot}SiO_2$ glass or slag at the metal-mold interface so that sealing of the pores between the sand grain occurs[28]. The extent of slag formation would increase with casting thickness, and the process is directly comparable to the use of heavy slag coatings on the mold surface, as described earlier in these articles. For casting of heavy section, the incorporation of fine fillers into the CO_2 sand is practiced by many foundries.

Chamotte Molding — The demand for heavier and heavier steel castings has seen an increasing use of "Compo" or chamotte molding.[29] This technique illustrates in many ways the ideal type of mold coating. The very coarse chamotte or compo is rammed up around the pattern, and after the pattern has been withdrawn, the exposed mold surfaces have a very open texture.

A chamotte paint then is applied to the surface, by both hand and trowel, and is sleeked into the pores between the large compo grains. A fine, alumina-based coating usually is brushed onto this sleeked surface. Although this technique is laborious, it does achieve a penetration of the coating into the pores of the mold surface and presents a surface virtually impermeable to molten metal.

It will be appreciated from the article that much more work needs to be carried out before a satisfactory solution to the problem of metal penetration and burn-on is obtained. It is hoped, however, that by highlighting the factors that encourage metal penetration, these articles will assist in reducing incidence of the problem in foundries.

Fig. 26—Example of "orange peel" defect often found on shell molded, low-carbon steel castings

Acknowledgement—This paper would not be complete without mention of the authorities and organizations who have aided and encouraged much of the work described. My thanks are due to the Department of Scientific and Industrial Research and to the British Steel Castings Research Association for financial support over the periods 1947-1950 and 1950-1952, respectively. Both the Research Association and many of its member firms, notably, F. H. Lloyd & Co. Ltd., K.&L. Steelfounders & Engineers Ltd., and Catton & Co. Ltd., have assisted in much of the research by providing materials and foundry facilities and particularly by their constant interest and encouragement. I would also like to thank the directors of Foundry Services Ltd. for enabling me to continue research into various aspects of this most absorbing problem and for their continued encouragement to find a satisfactory remedy.

Finally, I would like to express my profound gratitude to all of my colleagues, and, in particular, to Dr. T. P. Hoar, whose kindly guidance and wisdom permeated the research carried out at the University of Cambridge, and to Dr. D. H. Houseman, for the many enjoyable hours we spent together during the research.

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Questions and Answers

Limitations on dimensional tolerances usually are based on agreement by parties concerned . . . Methods for producing small casting . . . Molds for glassware . . . Chunky casting causes trouble . . . Breaking cast scrap

Tolerances Set by Agreement

We operate a gray iron foundry producing drainage castings which frequently are of new design. The question of what constitutes a reasonable tolerance for gray iron continually is arising. We wonder if you know of any acceptable table which might be in use. We have noted the table presented on page 115 of the April, 1957, issue, but wonder if something more specific might be available insofar as acceptability is concerned.

SINCE a number of factors are involved, dimensional tolerances for castings usually are determined by agreement between the purchaser and the foundry. This best is explained by the following excerpt from the recently issued *Gray Iron Castings Handbook* published by the Gray Iron Founders' Society, Cleveland:

"Due to the importance of the individual design and the fact that many of the foundry process details are selected with consideration for the characteristics of each pattern, the casting requirements such as surface smoothness, dimensional tolerances, or machining allowances cannot be stated in a general specification. These requirements are usually established on a most satisfactory basis by personal liaison with the foundry.

"Ordinarily the variation in casting dimensions can be held to within a half of the patternmakers' shrinkage allowance, which on a simple 12-inch casting dimension would be a tolerance of plus or minus 1/16 in. Closer tolerances than this often are obtained on repetitive production where corrective adjustments can be made. For such castings a tolerance of plus or minus 1/32 in. in an 8 to 12 inch dimension may be considered normal. With some of the new molding processes tolerances as close as 0.003 to 0.005 inch have been maintained, but to speak of a tolerance of three-thousandths of an inch is not correct, because tolerances do not vary proportionally with the casting.

"Dimensions within one half of the mold are generally more accurate than those across the parting plane or related to a cored surface. Dimensional tolerances are affected directly by the type of pattern equipment that is used; particularly when machine molding or coremaking methods are employed. Metal patterns and coreboxes that are machined to size will often provide closer tolerances than will cast-to-size metal patterns or wooden patterns".

The above comment appears particularly applicable to new designs in castings with which you are familiar. You know or should know what tolerance limits you can meet without difficulty in what may be called standard or commonly used designs. Comparison of a new design with a standard design should indicate whether proposed or requested dimensional tolerances or other features can be met. If they cannot, then the matter should be discussed with the designer, pointing out the reason or reasons, and obtaining permission for broader limits or a change in design. Of course, the best procedure is to consult with the designer before he is too far along with his design.

Production of Small Castings

We are located in Mexico, and have a request for large quantities of the small casting we are forwarding for your enlightenment. We wound like to know if we can obtain a metallic mold for production of this particular casting.

CASTING submitted for consideration is the metallic accessory for a child's, or more specifically young girl's, game known as jackstones, or commonly as jacks. This particular casting is made of gray iron, and we doubt that it is made by other than the green sand casting method.

Although the shape of the casting is such that it would be ideal for production by the permanent mold process, the thin sections involved would cause difficulty in filling the cavities. The thin sections also would result in castings with a white fracture which would necessitate an annealing operation or graphitizing heat treatment to overcome the inherent brittleness of white cast iron. That operation would add to the cost, and probably make it unprofitable.

Possibly your reference to metallic molds pertains to production of the jackstones by the pressure die-casting process. They are made that way, using zinc-base alloy. Such castings will be slightly lighter in weight than their cast iron counterparts, but we doubt that the users would notice the difference.

Produces Molds for Glassware

One of our larger accounts is a glass company for whom we make bottle molds in a variety of shapes and sizes. Present practice is to make the molds in halves, using a cast iron chill to form the cavity. Castings then are milled on the face, machined outside, the design of the bottle outlined by a duplicator machine, and finished by hand scraping and polishing. Our customer is interested in having the castings cast to finish size incorporating design, lettering, etc., and leaving a minimum of scraping and polishing. Do you know whether foundries in the U. S. are doing this successfully? Could this be done by using the CO_2 process for molds and cores?

YOUR practice of making glass molds wherein the operating face is cast against a metal chill is the common method when the usual alloy gray irons are employed. Investigation some years ago indicated that while the sand-cast material possessed good heat resisting properties, the slow cooling rate resulted in formation of large graphite flakes which prevented development of the satisfactory polish on the mold face required for smooth-surfaced glassware. If the composition is changed so that finer graphite is precipitated in sand casting, then the service life is not nearly as good. Similarly, if a white skin results in the chill casting method, the life of the mold decreases considerably.

While we do not have any definite knowledge of glass molds being "cast-to-size," it should be possible.

Essentially the practice requires accurate patterns and close control of sand, molding, pouring temperature, etc.

Use of the CO_2 process for cast-to-size operations appears to have good possibilities, particularly if the hardening of the mold or mold surface is accomplished before the pattern is removed or the core removed from the corebox. That practice provides rigid sand formations. Like any other molding procedure, however, all the details must be developed by investigation, and then followed exactly each time. Instead of using a metal chill to form the face of the casting, you might try silicon carbide sand, which has a much higher rate of heat abstraction than silica sand although somewhat less than that for cast iron.

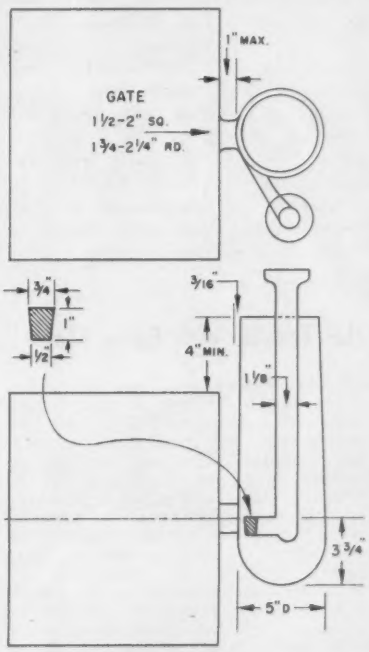
Gating for a Chunky Casting

We are having trouble with shrinkage in a casting 14 in. in diam and 12 in. long. We have gated on the side with a 6-in.-diam riser off the top. Also gated on the side with a 3-in. square gate combined with a riser 4 in. in diam. Each of the castings contained shrink holes and we would like advice on overcoming the trouble.

GATING of chunky castings to secure dense solid products always is a problem, but we believe the procedure indicated in the accompanying sketch will prove satisfactory. This method of gating and risering was described by Winte and Barlow in the August, 1945, issue of FOUNDRY. It employs a downsprue supplying molten metal to a substantial blind riser through a runner attached tangentially. The riser supplies metal to the casting through a short gate which, as indicated, should not be over 1 in. long.

Dimensions of the system for the particular casting are taken from the article and should be followed as closely as possible to insure proper functioning. The blind riser is 5 in. in diam with a slight taper for ease of removal of the riser plug during molding. It extends 4 in. minimum above the highest part of the casting, and 3¾ in. below the parting line. Runner connecting the downsprue, about 1⅛ in. in diam, is of trapezoidal form. Gate from the riser to the casting may be 1½ to 2 in. square or 1¾ to 2¼ in. in diam. It should be as short as possible, but not over 1 in. long.

Two other possible gating methods for this cylindrical casting include use of pencil or pop gates and



Suggested method for gating

the Connor gate, sometimes referred to as the kiss gate. In both procedures the casting would be molded in the vertical position. For pencil or pop gates we suggest making a basin in the cope about 2 in. wide extending the full depth and a couple of inches wider than the face of the casting. Bottom of the basin is closed with a slab core about ¾ in. thick; it contains ten holes 5/16 in. in diam spaced 1 in. apart along the centerline, with the first hole 1 in. from the edge of the casting cavity.

For the Connor or kiss gate we suggest use of two feeders spaced about 120 degrees apart which are supplied with molten metal from a single sprue. The feeders should overhang the edge of the casting cavity preferably 1/16 in., but not over ⅛ in., and should be about 4 in. across the front edge. The feeders are in the cope and extend down to the joint line, of course. We believe the cope should be 6 in. deep, and that the remaining dimension of the feeder should be 6 in. That will provide two feeders 4 x 6 x 6 in. Possibly by experimenting you could reduce the size of the feeders.

Wants To Break Cast Scrap

Please advise us where we might purchase a machine to be used for breaking cast iron scrap. If there is no such commercial machine, has your magazine ever published an article containing drawings and description of such a machine? We realize that it would be an easy matter to plan such a machine using a drop ball and some some sort of drive which would carry the ball high enough and then trip. Any suggestions will be appreciated.

SO FAR as we know there is no commercial machine in the market for breaking cast iron scrap. Usual practice is to employ a drop ball, or skull cracker as it commonly is termed. The balls vary in weight from 2 to as much as 20 tons and may be spherical or pear-shaped. They are elevated and released by various means.

Choice of ball weight will depend upon the size, shape and cross section of the scrap to be broken and the height to which the ball may be raised. A 4-ton ball dropped from a height of 50 ft will deliver an impact of 400,000 ft lb, but if the available height is only 25 ft, a ball weighing 8 tons would be needed to deliver the same impact.

Simplest method of handling the ball is with an electromagnet and suitable crane facilities in either a permanent installation spanning the stockyard or a crawler type with a sufficiently long boom. If such equipment is available only for moving the scrap in and out of the breaking area, a suitable headframe can be constructed, and the ball elevated by a power-driven winch equipped with a clutch. The cable should be attached permanently to the ball.

The ball is dropped by releasing the clutch and permitting the cable to unwind rapidly from the winch drum. It should not be too difficult to develop a mechanical trip

which is operated by the cable when the ball reaches the top of the supporting headframe. The trip can be arranged to sound an alarm or better yet, devised so that the brake will be applied and the clutch thrown out.

Scrap breaking should be conducted in a well protected area to prevent injury from flying pieces of metal. The area should be large enough to enclose the largest pieces of scrap as well as to permit free access. A common enclosure material is railroad ties placed on end surmounted with wire screening of about 1-inch mesh. Heavy boiler plate or reinforced concrete also may be used for the lower section of the enclosure.

How To Eliminate Slag Wool

We are troubled by the flying rock wool which blows out of the slaghole in our cupola. Can you tell us if there is any way to stop that material from forming by use of additives to the cupola mix?

FORMATION of the slag or rock wool is caused by escape of the cupola blast at the top of the slaghole when the slag level in the cupola drops sufficiently to permit that condition. Enlargement of the slaghole which allows the slag to flow out without completely covering the hole is one cause. Another is placement of the slaghole too close to the bottoms of the tuyeres. Indications are that when it is located about 5 in. below the tuyeres less trouble from wooling is encountered.

If your cupola is operated or tapped continuously, the wooling problem can be eliminated by installation of either a front-slagging spout or a rear-slagging siphon arrangement. Details of both are described in *The Cupola and Its Operation*. Sometimes a hinged iron cover over the slaghole is used to prevent slag wool from flying around the foundry. Another preventive is installation of an exhaust system. Descriptions of these two controls also are given in the previously mentioned book.

Protects Against Penetration

Using a 45 to 53 AFS grain fineness sand, what is the maximum percentage of silica flour you would recommend in a mold facing for a steel anvil casting with a pouring weight of about 50 tons? Also what would be the proper drying time for such a mold, using a portable gas dryer?

PRESUMABLY your interest in using a maximum amount of silica flour in the facing is to prevent penetration. In that case 30 to 40 per cent silica flour will give the densest compact which is most resistant to penetration. Such dense sands are subject to expansion defects, expansion scabs and veining, however, and should be employed only where necessary, especially in drag pockets. We would recommend that a normal, less dense sand be used in the cope.

It hardly is possible to supply information on exact drying times for portable dryers since they will vary not only with individual dryers, but also with individual molds. We would guess that at least 12 hours drying time would be required. The dense 30 to 40 per cent silica flour sands have practically zero permeability and must be dried thoroughly. For a casting as large as that mentioned, the sand should be dry to a depth of at least 8 in. back from the sand-metal interface. Additionally, if there is any question of the casting straining, the sand should be dried to a greater depth.

Has Trouble with Gassy Metal

Under separate cover we are sending you a section cut from a cored bushing that was cast from 77-8-15. As you readily can see, there exists a severe gas condition. However, we are undecided as to the exact cause of this condition—that is, whether it is a core, sand or metal condition. We have had less difficulty with low-lead-content bushings except for one bushing just lately cast of 83-7-7-3. We realize that this is a very sketchy picture we are presenting, but is there anything you can tell us as to why we should have trouble with cored castings of this type, but do not have trouble with solids cast from the same materials? Also, in making bronze bushings up to 12 in. diam and 13 in. long of 85-5-5-5, 80-10-10, 88-10-2, 83-7-7-3, and 77-8-15, what would be considered the best molding sand to use? Also what would be a good core mixture? Pouring temperature? Deoxidizer? What about lithium as a degasifier?

YOUR severe gas condition appears to us to be a combination of metal and core trouble. It also looks as though you have some shrinkage difficulty, but possibly that may result from the high gas content.

As you know, gassy metal usually is caused by melting conditions which result in a reducing atmosphere in the furnace, but it also may result from oily borings and turnings in the charge. Adjustment of the furnace burners to permit a slightly oxidizing atmosphere within the furnace is desirable.

Proper furnace atmosphere is obtained best by use of gas analysis apparatus, but a rule-of-thumb practice which is reported to be indicative is to thrust a piece of clean, cold zinc in the burner flame at the point of entry to the furnace. If soot is deposited on the zinc, it indicates reducing conditions due to incomplete combustion. If the zinc remains clean, the furnace atmosphere is neutral or possibly slightly oxidizing. If a yellowish deposit appears, conditions are quite oxidizing.

The cored hole shows larger gas holes in one continuous area along the length. They may result from the bushing being poured in the horizontal position or from an unevenly baked core. You do not mention whether the cores are vented. They should be to help gases to escape. It is just as important to provide the core vent a clear passage to the outside atmosphere. Uneven baking of the core may be due to lack of perforations in the core drier or to insufficient baking that prevented the bottom from being baked as well as the top.

It seems rather odd that you should have difficulty with cored bushings and not with solid sticks—that is, considering only gassy metal. Possibly the answer lies in the fact that melting conditions are not the same in both cases.

To provide suitable sands and core mixtures will require some experimental work. Molding sand usually is a compromise between fineness and lack of permeability. The finer the sand the smoother the surface, but decreasing permeability increases tendency toward blows. Perhaps a sand of around 100 AFS grain fineness and good distribution will serve. Core sand should not be too fine. With the large number of binders available, it should not be difficult to work out a satisfactory mixture employing the least binder.

Pouring temperatures for the various alloys mentioned appear to fall in the same range of 1900 to 2250° F, but you will have to determine experimentally the most suitable range for each particular section size, and then see that the pourers keep within the established range. Deoxidizer usually employed for the alloys is phosphor-copper, from 2 to 4 oz of 15 per cent type per 100 lb metal. Information indicates that lithium functions effectively as a degasifier. For best results the manufacturer's directions should be followed carefully. Other agents for the purpose include copper oxide, copper boride, lead oxide, dry nitrogen injection, and vacuum degassing.

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Circle 608 on Page 51

Men of Industry

● CLEVE H. POMEROY

● CARTER KISSELL

National Malleable appointments

● DAVID W. BOYD

. . . Engineering Casting's v. p.

● HARRY G. McMURRY

. . . plant manager, Ford

CLEVE H. POMEROY was recently named chairman of the board of directors, National Malleable & Steel Castings Co., Cleveland. **Carter Kissell** has been elected president, a position Mr. Pomeroy has held since 1946. Mr. Pomeroy has been with the company since 1920. He became treasurer in 1935, secretary-treasurer in 1936, was named a director in 1938 and a vice president in 1944. Since 1936 Mr. Kissell has been a partner in Jones, Day, Cockley & Reavis, Cleveland law firm, and he has been closely associated with National Malleable for many years.

P. L. O'Neill has been named executive vice president, Iowa Malleable Iron Co., Fairfield, Iowa, in addition to his duties as general manager. **Jack Calhoun,** formerly with Solar Aircraft Corp., Des Moines, Iowa, has been appointed auditor and will assist **Wilson Heflin,** company treasurer. **Robert K. Eaton** has joined the sales staff of Iowa Malleable and its subsidiary, Everstick Anchor Co. He will assist **D. J. White,** president of Everstick Anchor Co. **W. L. Fry** is president, and **T. A. Louden** secretary of Iowa Malleable Iron Co.

Howard Hoyt, since 1953 with Borden Chemical Co.'s research laboratory in Philadelphia, has been transferred to the company's new foundry laboratory in Bainbridge, N. Y. Mr. Hoyt will be in charge of the resins and sands evaluation program.

● **David W. Boyd** was recently appointed vice president-general manager in charge of operations and sales, Engineering Castings Inc., Marshall, Mich. He was graduated from Michigan State University in 1939, when he joined Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich., as service manager. He left there in 1946 to become works manager-plant metallurgist and a director of Engineering Castings. Since 1955 Mr. Boyd has been assistant general manager of the company. He is a past chairman of the Central Michigan Chapter of AFS and has been nominated to be a national director for 1957-59.

Charles W. Sanford recently joined Crouse-Hinds Co., Syracuse, N. Y., as vice president-manufacturing. He succeeds the late Albert H. Clarke. Formerly manager of foreign operations, Philco Corp., Philadelphia, Mr. Sanford was also associated with Jack & Heintz, Cleveland, as vice president-manufacturing.

Wayne D. Staley, vice president, Duriron Co., Dayton, Ohio, was recently elected president of the Hydraulic Institute, an organization including in its membership a majority of the principal pump manufacturers in the country.

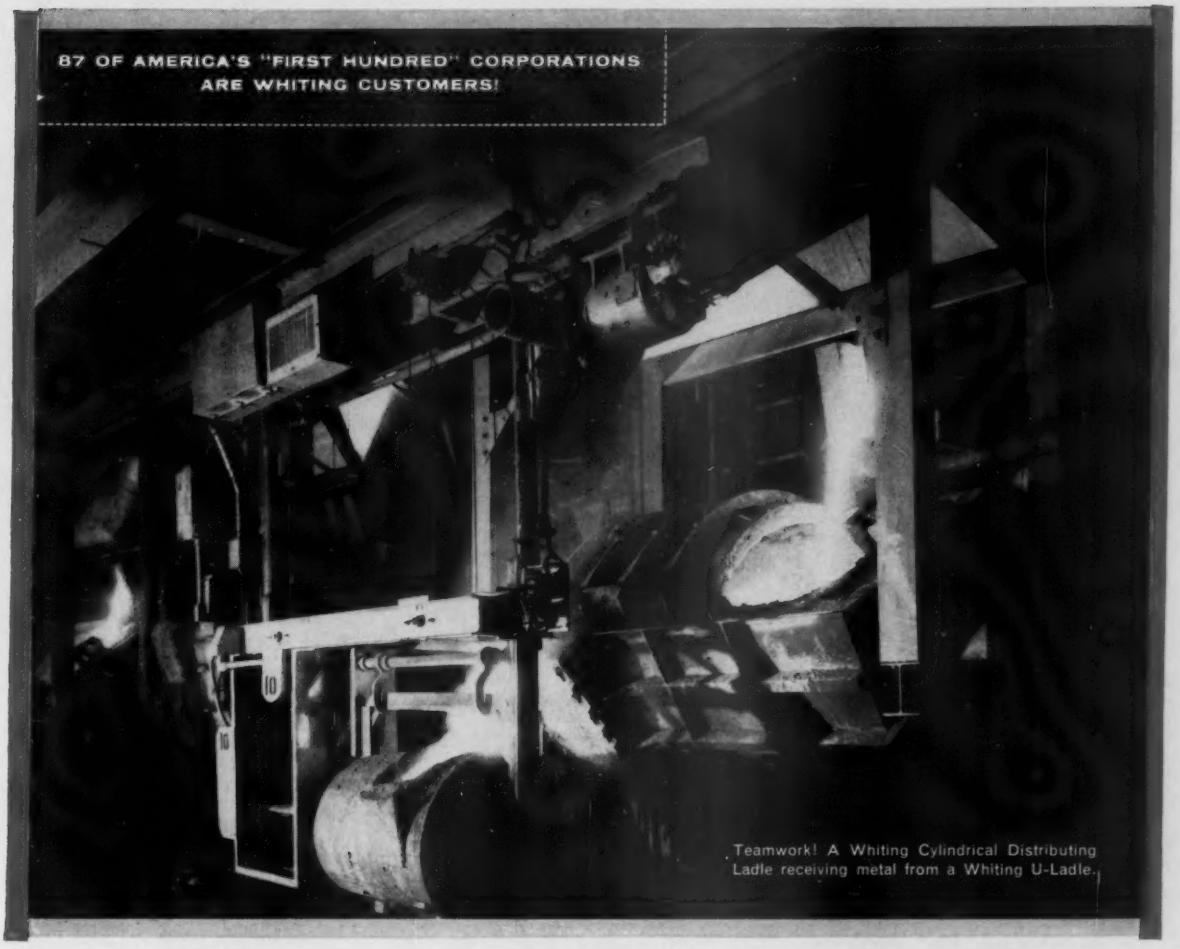
William F. Schlick, formerly western regional sales manager, Sterling Grinding Wheel Co., Tiffin, Ohio, has been appointed general sales manager of the company.

● **Harry G. McMurry** has been named plant manager of the aluminum castings plant, Ford Motor Co., Sheffield, Ala., succeeding **E. W. Day,** who will remain as an adviser at the plant until reassigned to another position. A graduate of Lambuth College, Mr. McMurry spent a number of years in foundry work with General Motors divisions before joining Ford in 1950 as assistant and later as manager of the company's Dearborn Iron Foundry, Dearborn, Mich.

Ralph L. Lee recently retired as secretary-treasurer, Grede Foundries Inc., Milwaukee, after 37 years of service. Mr. Lee joined Liberty Foundry, forerunner of Grede, in 1920. **Edwin W. Schenck,** the new secretary-treasurer, has been with Grede since 1956. He is a graduate of University of Wisconsin and was previously associated with Ripon Knitting Works, Cluett, Peabody & Co., and Robert W. Baird & Co.

George S. Pusey has been appointed superintendent of International Harvester Co.'s new foundry to be established in Santo Andre, Brazil. Mr. Pusey, who joined the company in 1947, has been superintendent of the core room of the Harvester Works, Milwaukee.

John W. Brown Jr., Brown Thermal Development Co., subsidiary of Brown Fintube Co., Elyria, Ohio, is making a tour of Europe to confer with company licensees in Germany and England and discuss the Brown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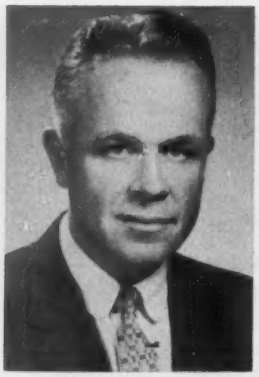
WHITING

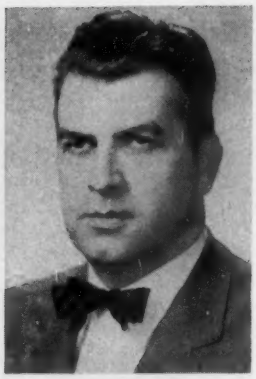
FOUNDRY EQUIPMENT

● KARL G. JANSSON
. . . becomes sales v. p.



● FORST L. ROBERTSON
. . . becomes sales mgr.

● J. H. BERTRAND



● J. M. PLANTEN

Lester B. Knight promotions

systems of heat recovery and blast heating for cupolas in iron foundries. While there he will make a study of German and British foundry techniques of air blast heating.

Raymond S. Hull, formerly associated with Aluminum Co. of America and the foundry products department, Borden Co., has joined Springfield Facing Inc., as New England sales representative with headquarters at the home office in Willimansett, Mass. He succeeds **Alexander S. Wright,** who was representative of the company for 8 years until his recent retirement.

Forbes Howard has been appointed general sales manager, Ainsworth-Precision Castings Co., Detroit. Ainsworth was acquired recently by Harsco Corp., Harrisburg, Pa., and merged with its Precision Castings Co. division. Mr. Howard was formerly with United-Carr Fastener Corp., Cambridge, Mass., and then formed New Devices Corp., maker of automotive parts, which was later sold to a Detroit company.

● **Karl G. Jansson** has been named vice president-director of sales, Keokuk Steel Casting Co., Keokuk, Iowa, and its subsidiary, Mid-Continent Steel Casting Corp., Shreveport, La. He was formerly vice president-general sales manager. **Forst L. Robertson** has been made sales manager of Keokuk Steel Casting Co. He joined the company in 1950.

● **Edward E. Mueller** has been named president, Whirl-Air-Flow Corp., which recently was moved from Chicago to Minneapolis. **Ray G. Pence, George W. Anselman,** and **G. L. Babcock** have been made vice presidents. They have been with the firm since it was incorporated. Prior to joining the company last year, Mr. Mueller was president, Foundry Supply Co., Minneapolis. Previously he was with Diamond Iron Works in sales and engineering work. Mr. Pence was a sales engineer, Hydro-Blast Corp., Chicago, until he joined Whirl-Air-Flow in 1953. Mr. Anselman was with Beloit Foundry Co., Beloit, Wis., as plant superintendent-vice president. Mr. Babcock joined the company in 1953 when it was a division of Gerwin Industries and later moved to Chicago with the firm.

● **J. H. Bertrand** and **J. M. Planten** have been appointed vice presidents-plant engineering, Lester B. Knight & Associates Inc., in Chicago and New York, respectively. Mr. Bertrand joined the firm's Chicago office in 1956 as manager of plant engineering. Mr. Planten went with the Knight organization in 1946 and was appointed manager of plant engineering in the New York office in 1953.

Rayburn Orr has been appointed sales engineer in charge of development, Renfrow Foundry, Los Angeles.

Dan D. Williams has been appointed assistant general sales manager, and **Curt K. Wiley,** Pittsburgh district sales manager, Refractories Div., H. K. Porter Co., Pittsburgh. Mr. Williams had been associated

● G. L. BABCOCK

● EDWARD E. MUELLER

● RAY G. PENCE

● GEORGE W. ANSELMAN

Whirl-Air-Flow appointments

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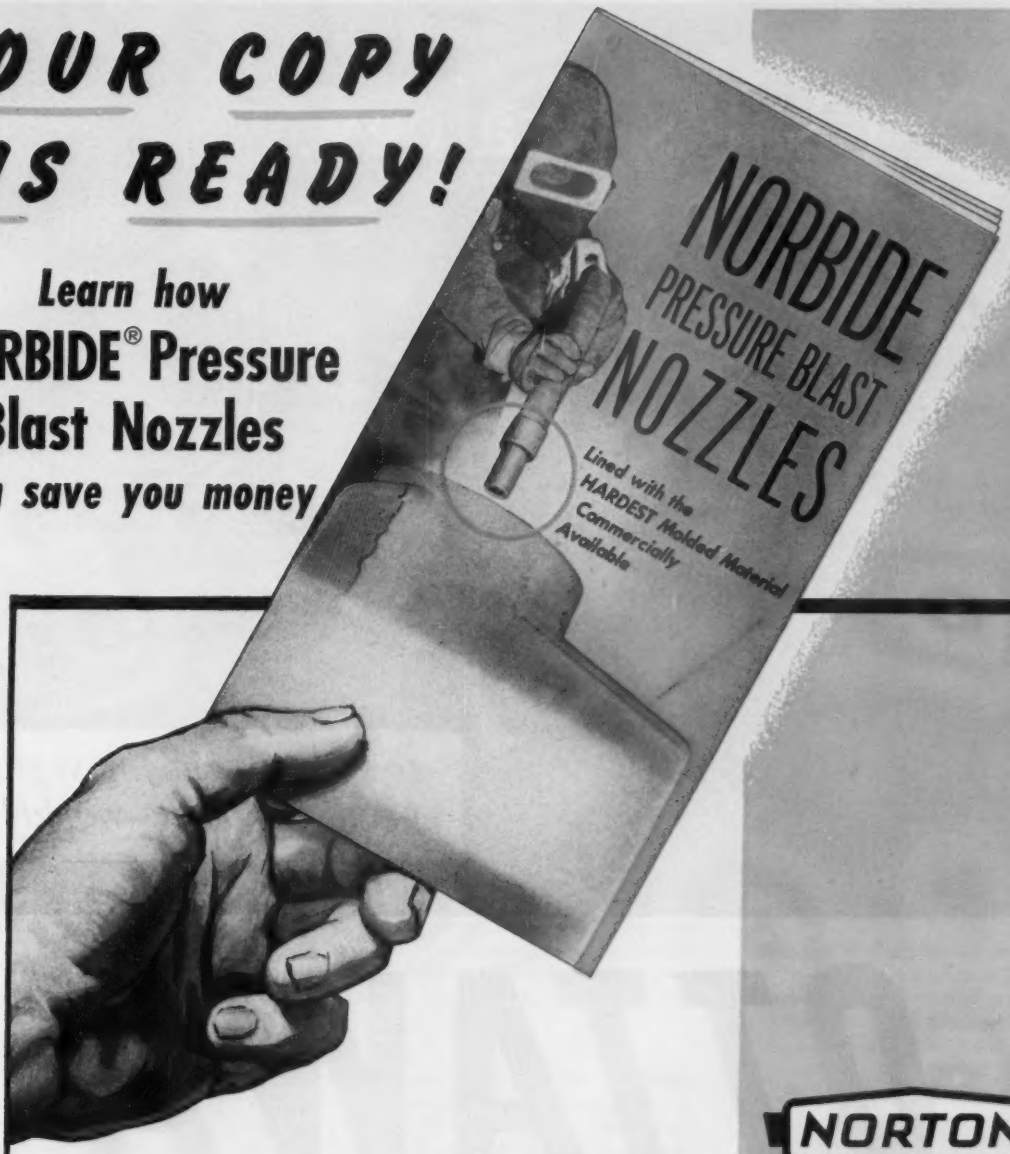

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SERVING THE FOUNDRY, GLASS AND CERAMIC INDUSTRIES FOR OVER 50 YEARS

● **CLARENCE H. CLINE**
. . . joins Enderlein Co.

● **GEORGE SMITH**

● **JOHN WILLIAMS**

Florence Pipe Foundry appointments

● **GUY H. PITTS**
. . . Bohn Aluminum v. p.

with E. J. Lavino & Co., Philadelphia. Mr. Wiley was formerly president, Gem Clay Forming Co., Sebring, Ohio.

● **Clarence H. Cline** has been appointed superintendent, H. G. Enderlein Co., Philadelphia. Mr. Cline was formerly assistant general manager, Palmyra Foundry Co., Palmyra, N. J.

S. A. Bruno has been appointed district manager in the New Orleans district, Air Reduction Sales Co., New York, succeeding **L. F. Bruno,** who has retired after 38 years with the company. **F. T. Wilson Jr.,** formerly a salesman in the Louisville, Ky., district, has been named assistant sales manager in New Orleans, the position S. A. Bruno has held since 1930.

● **John Shaughnessy** was recently named northern Ohio sales representative, W. W. Sly Mfg. Co., Cleveland. Prior to joining the company's sales department over two years ago, Mr. Shaughnessy was associated with a centrifugal and propeller fan manufacturer.

● **George Smith** was recently appointed general foreman, and **John Williams,** assistant foreman, of the new foundry of Florence Pipe Foundry & Machine Co., Florence, N. J.

Frank H. Barnes, formerly purchasing agent for Krupp Mfg. Co., Quakerstown, Pa., has become affiliated with the Philadelphia sales staff of Debevoise-Anderson Co. Inc., seller of pig iron, coke, and ore.

● **N. L. Heffron,** until recently manager of the Newark, N. J., district, Pure Carbonic Co. Div., Air Reduction Co., New York, has been appointed sales manager of the northeastern region. He joined the company in 1934 as a warehouse supervisor.

● **Thomas H. Brumagin** has been named general sales manager, Ajax Flexible Coupling Co., Westfield, N. Y., in addition to his duties as secretary and a director. A graduate of Case Institute of Technology, he joined Ajax 11 years ago.

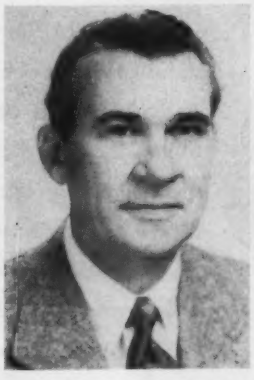
● **Guy H. Pitts** has been elected vice president-manufacturing, Bohn Aluminum & Brass Corp., Detroit. He joined the company in 1950 and previously served as chief engineer, plant manager, and manager of the fabrication division.

Ward M. Troutman, since 1954 Pittsburgh district sales manager, General Refractories Co., Philadelphia, has been named vice president of the company. He will remain in Pittsburgh. Mr. Troutman joined General Refractories in 1947 as a member of the Pittsburgh sales staff and became assistant district sales manager in 1953.

Brinton Welser, senior vice president and a director, Chain Belt Co., Milwaukee, was honored recently at a reception at the University Club there, upon his retirement after 44 years with the company. Mr. Welser became a vice president in 1930.

● **Elliott N. Dorman** was recently named sales manager, epoxy structural applications resins, Ciba Co.,

● **JOHN SHAUGHNESSY**
. . . Sly Mfg. Co. sales



● **N. L. HEFFRON**
. . . regional sales mgr.

● **THOMAS H. BRUMAGIN**
. . . general sales manager

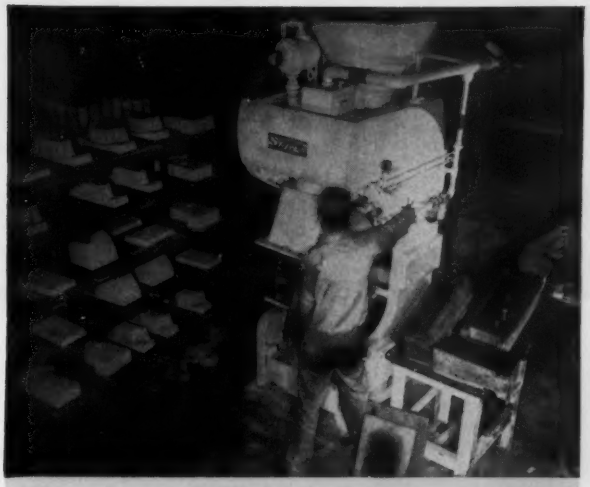
● **ELLIOTT N. DORMAN**
. . . sales mgr., Ciba Co.

*I TOLD B&P TO

PROVE IT!

...that FLEXIBLOS handle any core box ...with any core sand ...at lower cost!

Sure we wanted to do a better job in our core room and save money too, but we wanted actual proof before going ahead with Flexiblos. That's why I went to Chicago for an actual demonstration. I took along some of our toughest core boxes and sent ahead samples of a really difficult sand. Other blowers had failed and I wanted B&P to prove that these boxes could be blown with my sand on a Flexiblo. I'd given up on other machines—even the imported ones—and that's why the results of my trip to Chicago were so gratifying.



PROVED! FLEXIBLOS HANDLE ANY CORE BOX THAT CAN BE BLOWN ON ANY MACHINE

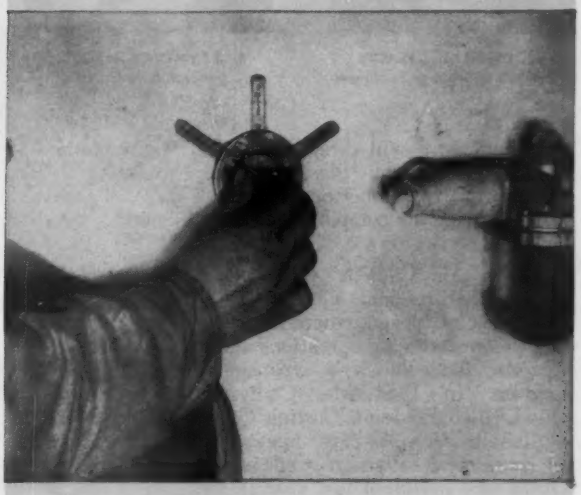
Flexiblos not only successfully handled those boxes that had been blown on other machines, but successfully handled boxes that could not be blown on other machines. Not only that, but Flexiblos handled the boxes using three distinct types of operation on the same machine. They call it three-in-one operation, and it provides for a normal full pressure blow, a regulated pressure prefill followed by a full pressure blow, or a regulated pressure pulse, at a flick of a selector lever.

PROVED! FLEXIBLOS HANDLE ANY CORE SAND THAT CAN BE BLOWN ON ANY MACHINE

The samples of core sand I sent ahead were really tough. I included new high strength sands, as well as the conventional sands that we were using in our core room. They loaded my extra tough sand in the hopper and then had a 200 pound man jump on it and compact it. I knew that no hopper compacting in my own foundry would ever equal that. Yet, the Flexiblo operated effectively and easily.

PROVED! FLEXIBLOS BLOW FASTER AND HARDER

You can bet that I wanted to inspect every core blown on the Flexiblo. I wanted to see if they were hard and uniform. I knew where the soft spots had occurred when these cores were blown on other machines, and I wanted to see if there were soft spots on the Flexiblo cores. I checked a lot of cores and every one was hard and uniform. They had been blown faster than I had ever seen a machine blow cores of their size and shape.



PROVED! FLEXIBLOS BLOW AT LOWER COST

Naturally I was interested in cost, since in our foundry we have to justify every penny we spend. I wanted to know about initial cost, installation cost and operating cost. I had expected a pretty steep price tag on a machine as good as the Flexiblo, but I was surprised. These machines are priced competitively, and when you consider that three-in-one feature, nothing else comes close to them. I studied installation costs, too, and found that the rigid balanced cast frame of the Flexiblo made it easier to install and easier to keep in effective operation after installation. I found that the new diaphragm clamp system produced such a tight seal that blow-bys and core box wear were eliminated.

THAT'S WHY I BOUGHT FLEXIBLO!

*Based on 24 actual operating demonstrations.

Beardsley & Piper Div. of Pettibone Mulliken Corp.
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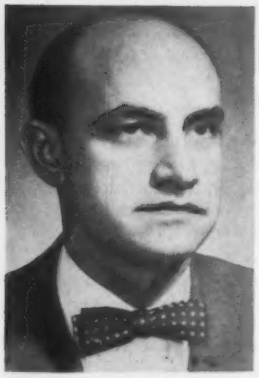

● **JOSEPH H. CADIEUX**
. . . joins Casting Engineers

● **RAYMOND F. FOSTER**
. . . general foundry foreman

● **FRANK P. MORROW**
. . . Superior Foundry sales

● **FREDERICK W. BURGIE**
. . . general sales manager

New York, and will direct sales of materials from the Plastics Div. headquarters in Kimberton, Pa. He has been with the company 7 years.

● **Joseph H. Cadieux** has been named vice president, Casting Engineers Inc., Chicago, where he will direct manufacturing operations and supervise the company's expansion program. In 1954 Mr. Cadieux joined Misco Precision Casting Co., Whitehall, Mich., as plant manager of its Detroit division and was named vice president last year.

F. E. Garriott has been named sales manager of finished products, **I. S. Levinson,** sales manager-technical products, and **G. E. Brown,** general manager of field sales, Ampco Metal Inc., Milwaukee. Mr. Garriott was formerly manager of the Weldrod & Wire Department. Mr. Levinson has been product manager-process industries sales. Until recently Mr. Brown was Wisconsin district manager for the company. **Raymond J. Severson,** former assistant general sales manager, has been made manager of the company's new branch in Garland, a suburb of Dallas, Tex.

● **E. A. Quinlan,** since 1946 salesman in the Minneapolis district, Air Reduction Sales Co., New York, has been appointed assistant sales manager of the district. With Airco for more than 20 years, in 1944 he became a railroad mechanical specialist, working out of Chicago.

Harold S. Walker Jr., for the last year secretary, American Gas Association, New York, has been named assistant to the managing director. He joined the staff early in 1955 as secretary of the general management section.

● **Raymond F. Foster** has returned to Link-Belt Co., and has been appointed general foreman of its Olney Foundry Division, Philadelphia.

● **Frank P. Morrow** has been appointed sales engineer, Superior Foundry Inc., Cleveland. For 8 years he was sales manager, Standard Alloy Foundry, and he spent 10 years as vice president-general manager, Robinson Tool Fabricating Co., both of Cleveland. At Superior Foundry Mr. Morrow will be engaged in promotion of the company's steel castings and he will also aid in the sale of gray iron castings.

Mario Olivo has been elected an honorary member of the Association Technique de Fonderie de France in recognition of his cooperation in the technical field between the Italian and French foundry industries. Mr. Olivo is president, Impianti Fonderie Olivo, Milan, Italy. He is chairman of the Dictionary of Foundry Terms Committee, International Committee of Foundry Technical Associations.

THEODORE H. BOOTH, elected president-treasurer, Frontier Bronze Corp., Niagara Falls, N. Y., as reported in February.

● **Frederick W. Burgie,** since 1955 assistant general sales manager, Doehler-Jarvis Div., National Lead Co., Toledo, Ohio, has been appointed general sales manager of the division, succeeding **E. R. Zabriskie,** who has been assigned special work with the general manager. Mr. Burgie joined the division in 1922, became chief engineer of the Toledo plant in 1928, and sales manager there in 1945.

James H. Moore has been named general manager and **Harry D. Stone,** sales manager, NRC Equipment Corp., subsidiary of National Research Corp., Cambridge, Mass. Mr. Moore was the first general manager, Vacuum Metals Corp. Div., Crucible Steel Co. of America, organized by National Research and jointly owned with Crucible for several years. Mr. Stone joined National Research Corp. in 1954 and became manager of vacuum equipment sales in the Cleveland area.

A. H. Patten, Patten Engineering Co., Denver, has been named sales-service representative, Federal Foundry Supply Div., Archer-Daniels-Midland Co., Cleveland. Mr. Patten handled A-D-M core binders before that company's merger with Federal Foundry Supply Co. He succeeds the late William Goebel, who represented Federal Foundry in Denver.

Dr. Donald J. McPherson has been appointed manager of the metals research department, Armour Research Foundation, Illinois Institute of Technology, Chicago, succeeding **Robert A. Lubker,** who has been named director of research, Alan Wood Steel Co., Conshohocken, Pa. Mr. McPherson recently was assistant manager of the metals department.

THE NEW DEMMLER 70

A YEARS-AHEAD DESIGN BLOWS OR SHOOTS ANY TYPE CORES FROM OUNCES TO 10 POUNDS IN WOOD OR METAL BOXES

Latest Sleeve-Type Stationary Magazine: Slot design for most efficient operation; suitable for all core sand mixes.

Shoot Heads: Interchanged in seconds; no wrenches needed.

Quick-Change Blow Plate: Cam-operated clamps; no wrenches needed.

Horizontal Clamps: Quickly adjustable, horizontally and vertically without wrenches.

Fully-Enclosed Draw Mechanism: Six-inch accurate draw stroke.

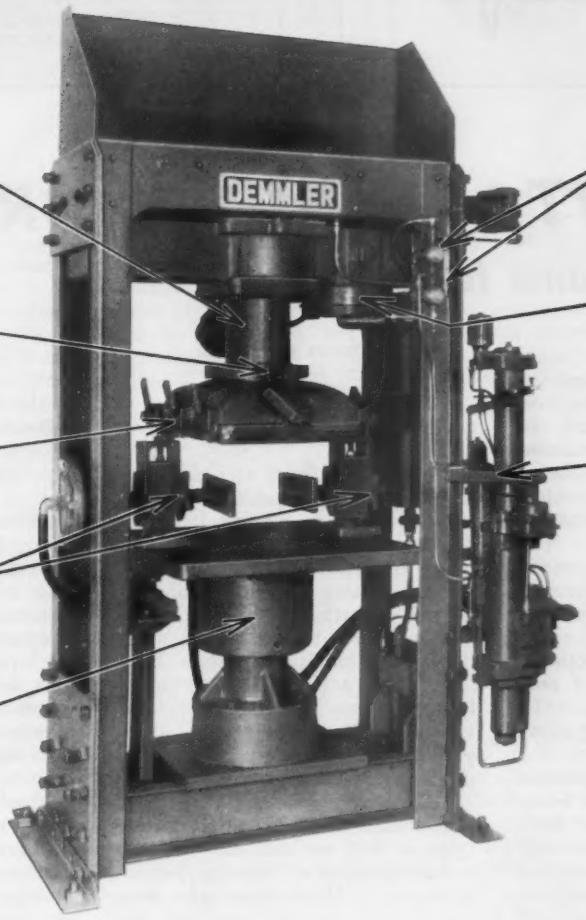

Table Height Adjustment: Push-button operated, eight-inch hydraulic adjustment.

Fast-Acting Large Size Diaphragm-Type Blow Valve: Easily replaceable diaphragms are the only wearing parts.

Automatic Sequence Control: One push of operating lever puts machine through a complete cycle.

Safety Controls: Machine is inoperative unless core box is properly located.

GET MORE FROM YOUR FOUNDRY DOLLAR

The new DEMMLER 70 is a low-cost, high-speed production machine, ruggedly constructed for heavy-duty use. Maximum versatility and ease of maintenance make this DEMMLER core blower a profitable addition for your foundry. Write us for more information. DEMMLER — since 1909 — the first name in core blowers.

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PRECISION CORE BOX VENTS

Demmler is by-far your best source for precision core box vents, manufactured by specialists who pioneered in the core blower industry. Many sizes, slot widths and screen meshes are available in brass and steel core box vents.

HL 150 MESH VENTS

A new general purpose vent which practically eliminates the cleaning coarser screens demand. Write for literature on Demmler vents.

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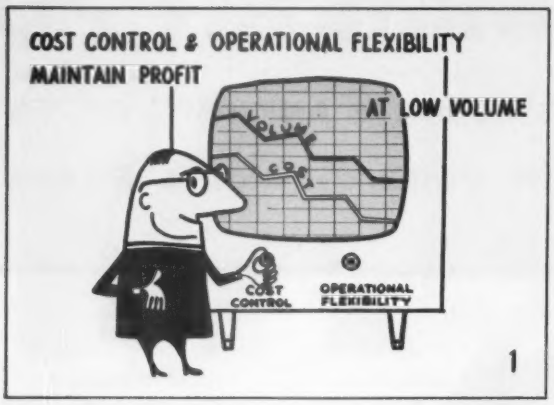
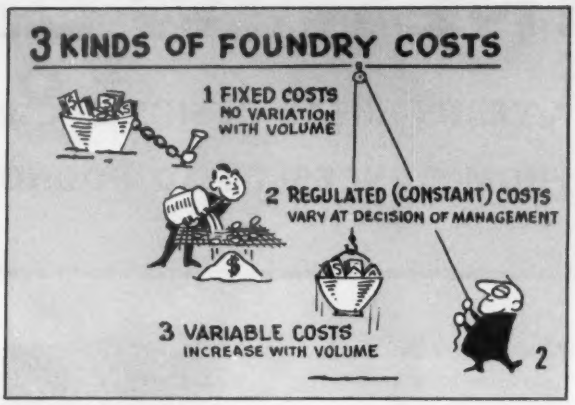




MAINTAINING A PROFIT

When Volume Is Low

By ROGER B. SINCLAIR
Management Engineering Division
Meehanite Metal Corp.
New Rochelle, N. Y.

RUNNING a profitable foundry at greatly reduced volume is a tough job for management, supervision, and men. Low-volume operations create special problems, all of which tend to raise operating costs when a company can least afford an increase.

Safeguards—Because we cannot speculate on the future, our immediate safeguard is in the answers to two basic questions: 1. Are we in a position to make a reasonable profit at a reduced volume of production—and where is our limit? 2. How adaptable to volume changes are our operations?

The answer to the first question is in cost control. When you know ahead of time the direct and indirect cost levels at which you still operate in the black, when you know the extent of necessary adjustments in all costs and expenses, and when you can predetermine the rates of direct to indirect labor requirements under changing conditions, you have come a long way toward meeting the dangers of low-volume operations.

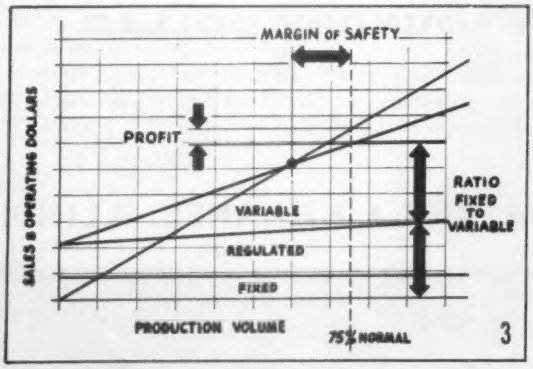
The answer to the second question can be found in the shop. Your flexibility to adjust operations quickly to the requirements of current volumes will permit you to lower your break-even point in line with decreasing sales.

This article will deal with these subjects: 1. How to predetermine costs so that we can show a profitable operation at lower production volumes. 2. How to adjust operations to the economies forced on us by the current recession.

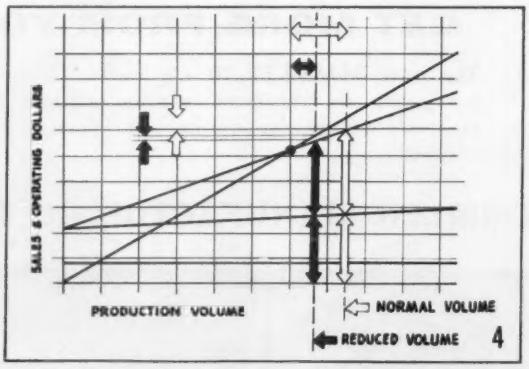
Break-Even Point—In recent months, a great deal has been said and written about break-even control of foundry operations. This business situation, more than any other, demands a careful study of all cost items which are affected most as the result of low volume. A break-even chart measures costs of operations against sales at different levels of production. When volume falls off, the chart predetermines the extent of cost reductions necessary to keep us in the black.

In every foundry, there are three basic kinds of expenditures:

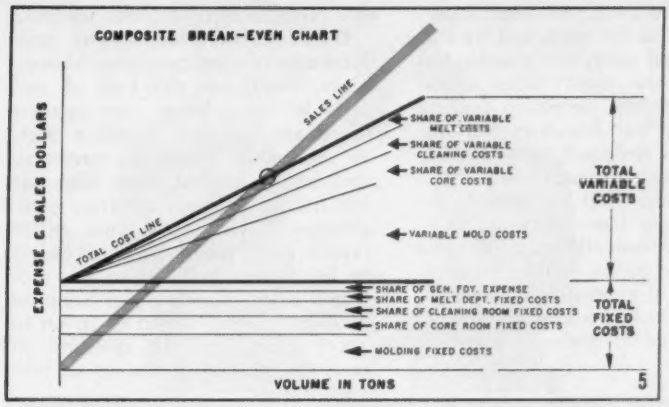
Fixed Costs — There are fixed costs, such as depreciation, taxes, insurance, etc., which are constant and not affected by variations in volume.

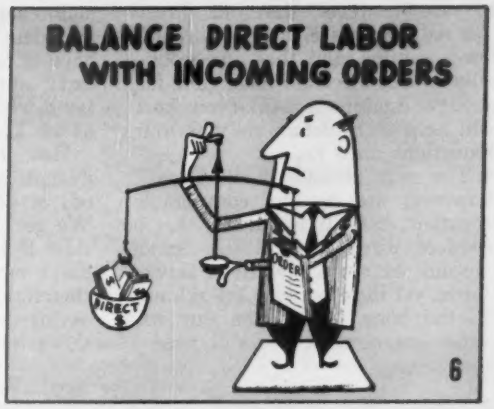


Break-even chart shows the relation of variable, regulated, and fixed costs to sales volume



How lower volume decreases the margin of safety between profit and break-even point is shown





Regulated Expenses—There are certain regulated expenses which, although more or less constant, are subject to change on management decision. These include salaries, a portion of wages in nonproductive operating costs, basic costs of administration, costs of selling, advertising, and sales promotion. This group represents a controllable level of expenditure necessary to keep our doors open.

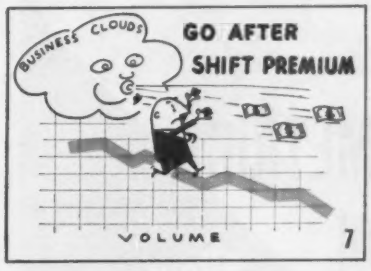
Although costs of this kind are not directly affected by volume, they require careful study when production decreases. It is this group which is most difficult to control, carries the largest amount of deadwood, and provides many business luxuries which we cannot maintain when the chips are down.

Variable Costs—Finally, there are variable costs. As the name implies, this kind of expenditure varies directly with volume. It includes direct and indirect wages—materials, and supplies.

Fig. 3 illustrates a typical break-even chart which shows variations of the three types of costs in relation to volume. We have one expense level which remains constant irrespective of volume, one that is constant, but subject to change on decision, and one which varies directly with our volume of production.

Now let us look at our sales. Volume rises with sales. The value line of sales crosses the total cost line at a point which will vary from foundry to foundry. At this point, we have reached a level at which the value of sales is equal to the costs of operations. This is the break-even point.

Assuming now that we are operating at normal volume, say about 75 per cent of capacity, we obtain from the break-even chart some very significant information, and we are ready to assess the influence of possible volume changes on the cost of operations. Considering this chart, we can see that at normal operating volume we would require about 60 per cent of the capacity load to break even. We know our approximate profits at this level, we obtain a ratio of variable to fixed



costs, and, what is very important, we know our margin of safety—that is, how much of a drop in volume we can stand before operations go in the red.

When Volume Declines—Now let us see what happens when our volume declines (Fig. 4). Our sales line moves to a lower level, our break-even point stays put, our profits are down, and our margin of safety gets close to the danger point of an operation at a loss. We also note that our ratio of fixed to variable costs indicates that we now have too much supporting expense in relation to production costs. The answer then is a reduction in our costs. The break-even chart tells us which costs and how much reduction. We have yet to determine where to cut, and for this purpose we must extend our controls into each of our mold producing departments.

Composite Break-Even Chart—We again use a break-even chart, but this one is limited to show the break-even point of departmental operations. In addition to the fixed, regulated and variable expenses of the normal chart, the composite chart shown in Fig. 5 also includes a share of all the other departments, such as coreroom, cleaning, melting, and general foundry expense, which contribute to operation of the section under study. The sales line on this chart includes, of course, only the dollar value of the castings produced in this section.

If, for example, your foundry consisted of three molding sections, let us say a squeezer section, a roll-over section, and a floor molding section, the departmental break-even charts for each department would indicate the cutbacks which losses in volume dictate for each section of your foundry. We know at this point which expenses to reduce, we know how great an adjustment we must make, and we know which departments are affected. Let us, therefore, once again look over our three types of foundry costs and see how the necessary cost reductions can be obtained.

We know that there is not much chance to lower our fixed costs. These will remain constant throughout. We also know that when our orders fall off, we have to cut back our direct costs. We know that there is a fall-off in material costs and a reduction in supplies. We must

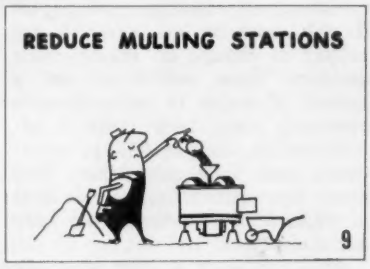
be sure, however, that our direct cost reductions are in line with the lower volume, and that our economies in this direction have gone far enough. Again, our break-even chart will help us to determine what our reductions must be.

The most difficult readjustments, however, are in our controllable constant costs. It is obvious that a reduced direct labor force cannot sustain the same amount of service labor, yet these sections are skinned to the bone, even when our volumes are normal. We still need a maintenance gang, we need superintendent and foremen, and we still have to mull sand, run a melt, and carry out the many other operations which are necessary as long as we keep our foundries working.

How To Reduce Costs—Cost reduction comes through better methods of doing what we have to do. We get even more constructive results if we can eliminate what we don't have to do. Let us consider, therefore, the possible avenues of savings which we must investigate if we intend to maintain a reasonable profit in spite of lower volume.

Direct Labor Force — The first point affects our direct labor force—which constitutes the bulk of our variable costs. When our volume drops and we find ourselves with an excess of molding, coreroom, cleaning, and other direct labor on our hands, we must resort to a reduction in our work week or to layoffs to balance labor with orders in hand or to conform to our projected sales expectations. None of us likes to lay off men or go on to short time, but the question of economy quickly forces us to take such a step.

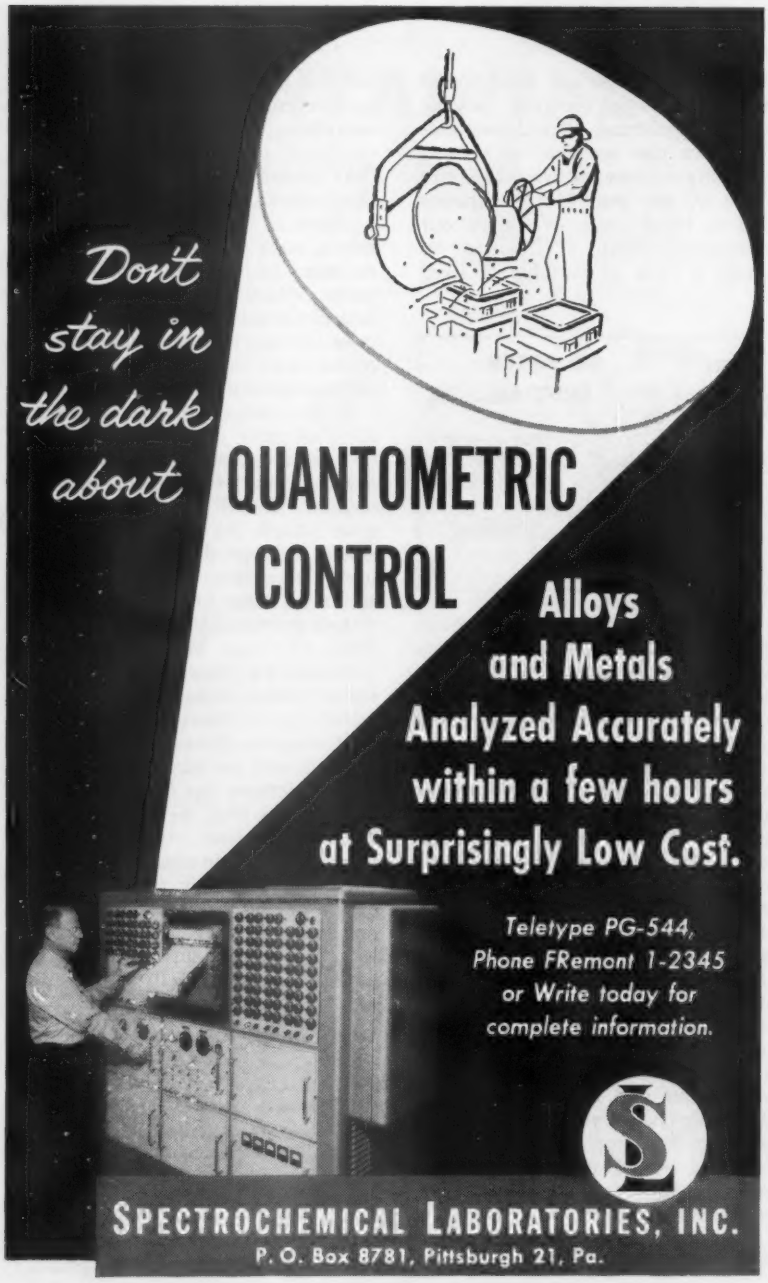
The type of direct labor reduction depends entirely on the conditions of the moment. If volume reduction covers all sections, short-time operations offer the greatest potential for savings. If orders are short for certain types or weights of castings, or if you have difficulties balancing operations, you may have to resort to layoffs.



Even shortening the work week must be considered with care. Some foundries do better to shut down on Friday. Others fare better with a Monday. The nature of your operations dictates the choice, and all possible considerations must be given to the savings which accrue from this step.

Shift Premiums—Another consideration in our efforts to reduce costs must be given to night operations or those which involve overtime. Shift premiums are a luxury which we cannot afford at low volumes. Careful staggering of shifts or even of individuals often can eliminate the late pouroff or the early start to prepare facing sand or to get patterns and flasks ready for the molders.

If you operate a night shakeout gang, take a close look to determine whether there is a need to maintain it. Lower volume means fewer molds, fewer molds mean more floor space, and more space creates a possibility of bringing the shakeout gang onto the day shift. Savings in shift premiums and pos-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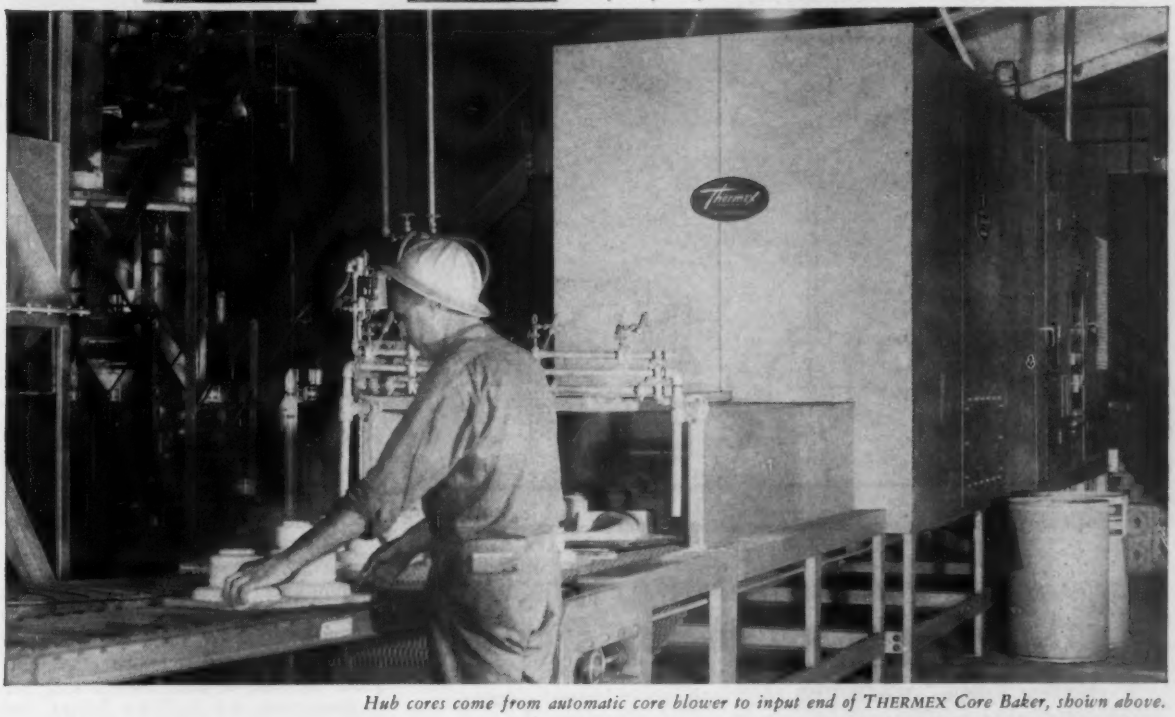
"Cores are better... costs are less"

Says Charlotte Pipe & Foundry Co.

J. B. Williams, Operator, and J. W. Price, Foreman, examine one of uniformly-baked hub cores.



Hub cores come from automatic core blower to input end of THERMEX Core Baker, shown above.

• The modern new facilities of Charlotte Pipe & Foundry for centrifugal casting of soil pipe include the THERMEX* 75KW Dielectric Core Baker shown above. It is part of an automated line, rated at 3500 lbs. per hour, for production of hub cores.

James W. Price, Foreman, says: "The THERMEX Core Baker gives us uniform cores with good surface hardness. Scrap loss due to breakage is very low. Quality is better and costs are less than for similar cores produced by other methods."

A THERMEX Engineer will gladly give you facts on how *you* can profit with this leading dielectric core baking equipment. Call our nearest office.

*THERMEX—T.M. Reg. U. S. Pat. Off.

Thermex® DIELECTRIC CORE BAKER

THERMEX DIVISION

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GIRDLER

PROCESS EQUIPMENT DIVISION

NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

Manufacturers of "VOTATOR" and "THERMEX" Processing Apparatus

Circle 615 on Page 51

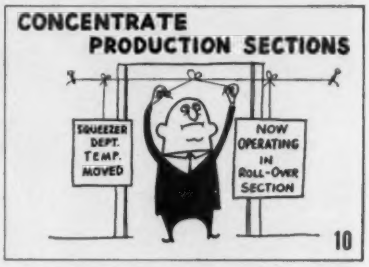
sible use of the day labor gang may help substantially to cut back the indirect costs of your operations.

Melting Economies—Another avenue of substantial savings is in the melt department. Running larger heats on alternate days offers savings in labor, coke, and relining costs of cupola or ladles and cuts power requirements and other melt department costs. Check carefully, however, to be sure that these savings are not lost in the molding or core departments, which may show added costs in handling, storage, and even labor after this change.

Sand Preparation Savings—Your sand preparation section offers more possibilities for economies. Many foundries have more than one sand muller to feed the various sections in the foundry. Check carefully to see whether it is possible to produce the reduced sand requirements in one muller, and to suspend the operation of the other unit as long as the period of low demand continues. It may mean a costlier single station operation, but as compared with operating two units, it will enable you to save on labor, power, handling, and distribution.

Layout—Further savings are possible through minor changes in layout. Concentration of activities into more confined areas will cut indirect help, lower handling requirements, and provide closer supervision. It stands to reason that it is cheaper to operate a fully loaded section than two operations at half volume. Such combinations are possible in squeezer and bench departments, in the coreroom, and sometimes in larger molding.

No mention has been made of economies possible in good scheduling, proper flask loading, better-



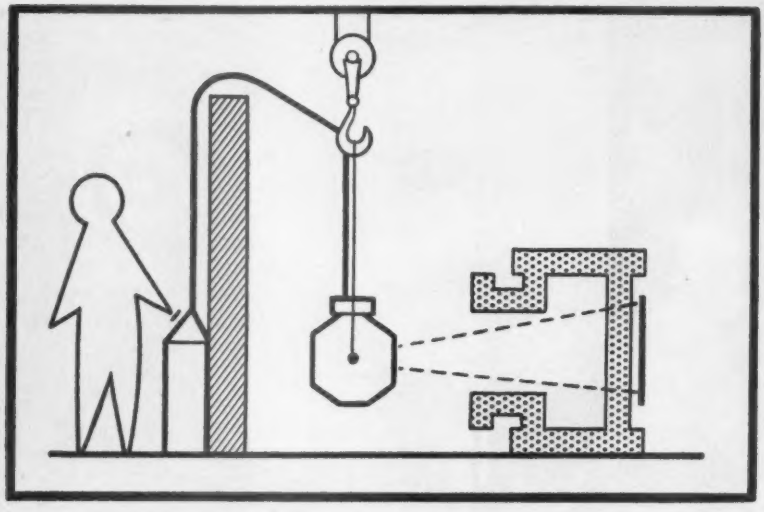
than-average productivity, minimum downtime, elimination of waiting time, crane delays, cleanliness, order, etc., all of which should be among the first efforts to meet the crisis caused by low-volume operations.

When you feel that you have completely exhausted all known avenues of possible savings, sit down and prepare an operator chart of all your indirect operations. You may be amazed to find how many unaccounted for indirect hours you still have in your foundry in spite of all efforts to eliminate unnecessary tasks.

All of these steps have been directed toward the reduction of direct labor requirements in line with demand and a complete revaluation of indirect needs, which must be trimmed to maintain a reasonable ratio to the remaining direct labor. Economies in operations are necessary, unpleasant as some may be. During periods of low-work volume, your company's profits won't come from increased sales, but from savings which you must make in your operations.

Ends Foundry Operation

Westover Corp., Milwaukee, has discontinued its foundry operations because of the need for space for its other activities.



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Nuclear Systems' Model 1060 Multitron, an industrial gamma radiography machine, gives results faster than a 1,000,000 volt X-ray machine and comparable to those of a 2,000,000 volt X-ray machine . . . *at a small fraction of X-ray machine cost.*

The Model 1060 is designed to safely handle up to 1,000 curies of Cobalt 60. Provided with completely fail-safe automatic controls, the beam-producing 1060 is operated from a remotely located console and is capable of making radiography exposures through nine inches of steel and upwards.

Dominion Foundries and Steel, Limited, Hamilton, Canada, uses the 1060 successfully and efficiently for quality inspection of extremely heavy steel castings.

Call on Nuclear Systems for your radiography equipment needs. Offices in Philadelphia, Chicago and San Francisco. Sales representatives in principal cities. Catalog on request.

Visit our booth at the Atom Fair, Chicago, March 17-21.

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INDUSTRIAL SAND

This extensive deposit plus scientific processing assure you the finest rounded grain pure silica sand for foundry use

24 standard grades in regular production

The chances are better than ever that your foundry operations now require high quality, more exact sand grades than they used to. With the new casting methods now used, sand is critical. It has to be pure, uniform and of a certain exact grade.

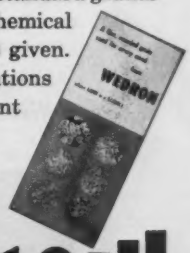
This close control of sand quality is only possible in a scientific sand processing plant such as Wedron's. Every step in the process is controlled to give users consistently high quality sand with these facilities. Wedron regularly produces 24 separate grades of sand as standard. From these grades it is possible for most users to choose a sand which will meet most any requirement. Where necessary, Wedron can produce special sand grades to customer specifications. A considerable amount of our regular production is in these special grades.

The Wedron sand deposit itself has special plus values for foundry users. Wedron sand is a pure, rounded grain silica with high heat and chemical resistance. It is highly desirable for foundries because it greatly reduces cutting out of core boxes and produces a smoother casting surface, grade for grade.

In many ways, Wedron is your best bet for foundry sand. Make your next order Wedron . . . for the best foundry sand available.

NEW SAND BOOKLET

This new booklet gives all the details on Wedron Sands for all kinds of industrial uses. Complete descriptive folder details the Wedron processing operations which produce the finest rounded grain silica sands. 24 separate standard grades are tabulated and chemical analysis of sand is given. Numerous illustrations of the Wedron plant and facilities are shown. Send for your copy today!



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Circle 617 on Page 51

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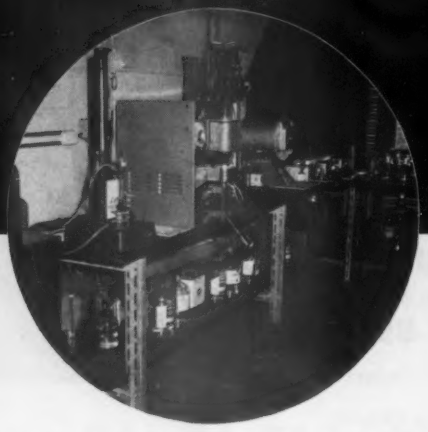

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We have placed a lot of earnest dollars on the line to develop outstanding laboratory facilities. This investment has been deliberate, because we have a reputation for top-quality, uniform metallic abrasives, and we want to maintain it!

Out of these facilities have come consistently rigid production standards which meet our own, as well as SAE, specifications. Also out of these facilities have come our two latest *new* products . . . "A" shot and grit, a controlled analysis chilled iron having extremely long life; and *Pearlitic Malleable* shot and grit.

These two new metallic abrasives, combined with our regular line of Persuasive Abrasives, give you a complete range and availability of product to fit your cleaning or peening requirements.

Paletized, banded, covered . . . any way you wish.

Write for our catalog or call in our nearest representative to discuss the Cleveland line further.

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Foundry Developments

By EDWIN BREMER
Metallurgical Editor

SATISFACTORY refinement in grain size and increase of ultimate strength in magnesium-base alloy castings is claimed in British patent No. 784,445 through use of a mixture of fluorspar and paraffin wax which is added to the molten metal. Mixture should contain 4.5 to 7 parts by weight fluorspar to 1 part wax. It also is said that the addition does not introduce gas into the metal.

Tempering Embrittlement

TREATMENT which effectively eliminates 550° F tempering embrittlement in SAE 1340 steel is described in a report, PB 131358, available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, for $1.25. Entitled "Study of the Effects of Vacuum Melting on 550° F Tempering Embrittlement," the report points out that the trouble was eliminated by purification of the alloy steel by vacuum melting in a system embodying the principles of the molecular still. It is believed that ordinary vacuum melting cannot accomplish the same result.

Checks Charpy Values

SINCE variations can occur in values obtained between different Charpy testing machines or in those obtained with one machine, procedures for obtaining concordant data were studied at Watertown Arsenal. Details of the investigation are given in a report available from the Office of Technical Services, Department of Commerce, Washington 25. It is PB 131117, "Impact Testing No. 1: Calibration of the Charpy Impact Machine and Procedure for Inspection and Testing Charpy V-notch Impact Specimens," by D. E. Driscoll. Price is $1.

Aluminum by Photometry

CAREFUL analysis for aluminum in reclaimed high-aluminum steel often is necessary to prevent its presence in subsequent steel stocks. A tentative spectrophotometric analytical procedure has been developed at Watertown Arsenal for determining 0.001 to 0.1 per cent aluminum. The method removes most of the iron and nearly all electro-reducible metals by a brief electrolysis at the mercury cathode.

Residual metallic interferences are complexed with tartrate and cyanide, and the aluminum is extracted in chloroform as the 8-hydroxyquinolate. Aluminum is determined spectrophotometrically at 390 mu.

Details are available in report PB 131107, "The Photometric Determination of Small Amounts of Aluminum in Steel Using 8-Hydroxyquinoline" which may be obtained from the Office of Technical Services, Department of Commerce, Washington 25, for 50 cents.

Information on Cobalt

NEW publication, "Bibliography on Electroplating Cobalt and Cobalt Alloys," is available from Cobalt Information Center, Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio. This 16-page bibliography encompasses literature on the subject up to June, 1957. The center also is offering a newly revised edition of "Corrosion Bibliography on Cobalt and Cobalt Alloys" containing over 150 references to literature published to mid-1957.

Gage of Melt Quality

INVESTIGATING methods to determine the melt quality of 85-5-5-5 red brass, Oya and Honma, as described in Report of the Castings Research Laboratory, No. 8, 1957, Waseda University, Tokyo, Japan, used the chilled specimen suggested by Rote, Baker and Upthegrove. Other specimens were cooled in a clay-graphite crucible. They conclude that while the chilled specimens may be suitable for melts free from aluminum and silicon, contamination from those elements promotes more extensive columnar and blue-gray formations and consequently results in misleading interpretations. Specimens cooled in the crucible clearly show presence of aluminum by whitish-silver tinge on the exterior surfaces and brighter blue fracture with some reddish brown pattern. Silicon gives a similar effect on fracture, but exterior surfaces are tinged with dark purple.

Moves Fast

SEVERAL magnesium - thorium (HK 31) sand castings are designed into the airframe of the Air Force's Bomarc interceptor missile being built by Boeing Airplane Co. They are in addition to extensive application of sheet and extrusions of similar composition. Material is used for temperature resistance and weight saving. In one instance, cast door frame and equipment mounting structure in the aft body section of the missile saved 6 lb over another type of light metal casting. Bomarc is a surface-to-air missile which weighs about 7500 lb and has an airspeed of 2000 mph and a range of more than 300 miles.

Close Control

NOVEL technique in the plaster molding process is reported by the Precision Casting Division, Airtron Inc., Linden, N. J. In this practice, the cores are made in sections and bolted together accurately with hidden studs and nuts. It is claimed that this sectional process affords greater control of internal dimensions and insures more accuracy for cast components. The technique is said to be especially beneficial in manufacture of aluminum alloy wave guides and other large units which require close dimensional and surface tolerances.

Old Man Hydrogen

CRACK initiation and propagation in hydrogenated steel may be caused by a critical combination of hydrogen concentration and triaxial stress state according to a report available from Office of Technical Services, U. S. Department of Commerce, Washington 25. Report is designated PB 131340 and entitled "Hydrogen, Crack Initiation and Delayed Failure in Steel." Price is $1.50 for the 52-page report.

"Production stepped up . . .
quality improved."

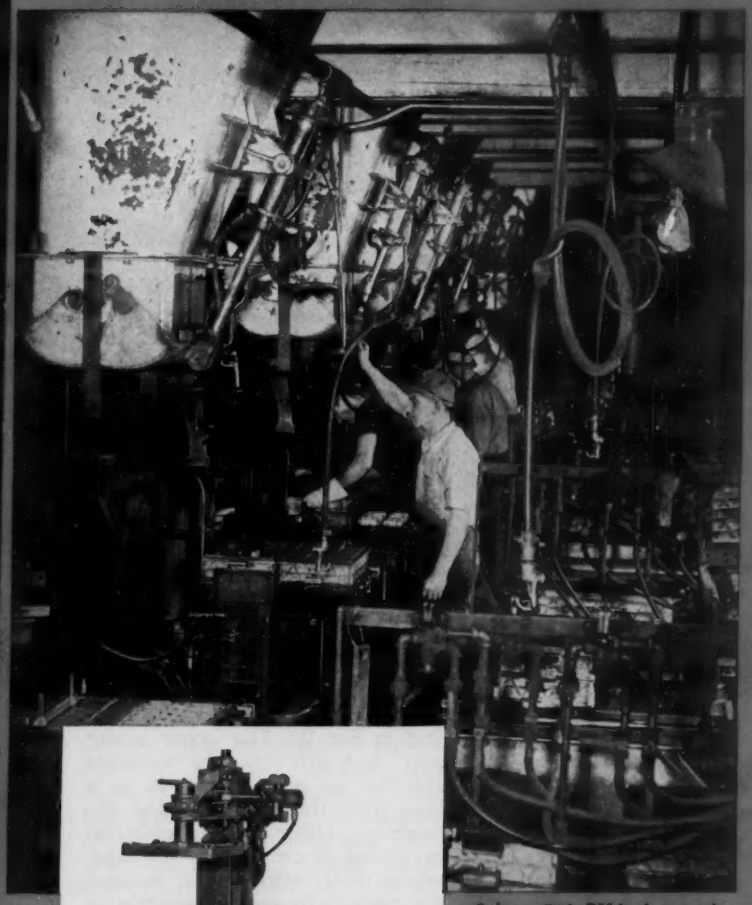
Westinghouse foundry

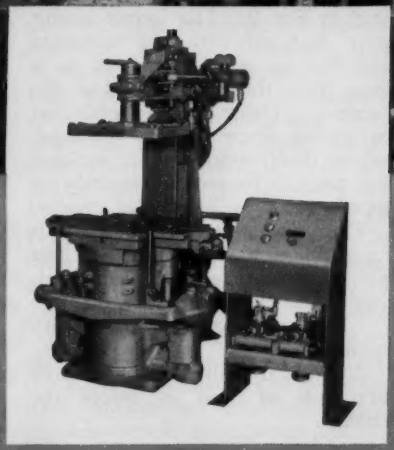
"Working conditions
really changed."

Osborn 721 PVA Automatic Vibrating Squeeze Pin Lift machines using 29" x 29" x 7/7 flasks.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

reaps the benefits from mechanization with OSBORN





Osborn 716 PVA Automatic Vibrating Squeeze Pin Lift machine using 12" x 18" x 4/4 flasks.

THEY'RE writing a new chapter in the production efficiency logbook at the East Springfield, Mass., foundry of Westinghouse Electric Corporation.

Mechanization with Osborn machines has paved the way for stepped up production and greater quality. But the mechanization program accomplishes an even greater benefit in the eyes of Westinghouse . . . it greatly improves working conditions.

The foundry mass-produces gray iron castings for components of electrical appliances. The castings range in size from one-half to 40 pounds.

Mechanization, which incorporates Osborn's vibrating-squeeze molding machines into an automatic handling system has reduced to one-fifth the amount of material handled per day.

Six steps—handling flasks, shoveling sand, conveying molds, shifting pouring weights, shaking out, and conditioning sand—are now carried out mechanically. Daily melt capacity has been increased 66%.

Let Osborn illustrate how foundry mechanization can become a money-making investment for your company. Write *The Osborn Manufacturing Company, Cleveland 14, Ohio.*

OSBORN

MOLDING MACHINES
CORE BLOWERS
SHELL MACHINES
INDUSTRIAL BRUSHES
BRUSHING MACHINES

Leader in automation for the foundry

Circle 619 on Page 51

Fig. 1—Original pattern and corebox produced a louvered cover with two small slots shown at X

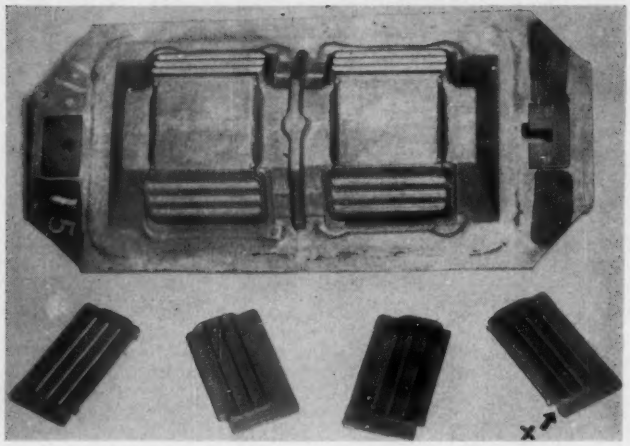


Fig. 2—Redesigned part has one slot and is made entirely in green sand with a matchplate pattern at much less cost

Improved Casting Design

CAN CUT FOUNDRY COSTS

By G. A. PEALER
Specialist, Casting Design
General Electric Co.
Elmira, N. Y.

THESE days of high costs and keen competition make it more important than ever to analyze all casting designs carefully. By such analysis, the foundryman can sometimes avoid doing a disservice both to his customer and to himself.

More and more the progressive foundryman is asking himself:

Is the design correct or can it be bettered?

Is the metal called for correct?

Does it fit in this foundry?

We know that most design engineers are perhaps experts in their field but, sorry to say, this field often does not include the foundry. It therefore becomes the duty of any conscientious foundryman at least to study the job and offer his knowhow to help produce a good functional part at the lowest possible cost to the buyer.

Must Fit the Job—First and foremost, a part must be so designed that it will perform the function for which it is intended.

Second, it must be so designed that it can be sold in competition with the best product of the other fellow. And since the eye must be pleased, we design for beauty. This is helpful because pleasing lines lend themselves to the natural flow of molten metal. We can create complex shapes with ease in a casting.

Next, we must be able to produce the part at a price. This is where we of the foundry should stand ready and willing to help not only our customer but ourselves. In our father's time, wages were probably one of the smaller items of cost. Time has changed this. Today a fraction of a minute spent by the coremaker, molder, or cleaner can add considerably to the cost of the finished product.

We must help the designer to make his part easy to produce in the foundry. Early in our careers we learned that projections on the draw side of castings cost extra labor to produce by forcing the use of cores or time-consuming loose pieces. Show the customer that the high labor cost for such work could be many times the material cost of continuing the projection to a parting or to a flange. We should also point out that uniformity of metal section simplifies the gating and feeding of the casting, resulting in much better metal control.

What Can Be Done—We recently received several sets of pattern equipment from one of our customers. The castings were louvered covers and were so designed that the only way they could be made was by using a dry sand core. The corebox was made with five loose pieces. The core had to be hand rammed by an expert coremaker and it was easily damaged in handling. This original pattern, corebox, core, and resulting castings are shown in Fig. 1.

In checking the design, we found that the engineer had included two small slots (indicated as x) to lock the part in the opening of the machine. We found the part would lock into place when these two projections were eliminated as shown at x in Fig. 2. The louver blades were designed with one thickness and flat so as to be drawn as a loose piece through the end of the corebox. There was no objection to giving these blades a taper across their width which enabled the part to be molded entirely in green sand by a less skilled molder.

The new pattern equipment is an aluminum matchplate of four patterns shown in Fig. 2. An analysis of this change shows:

1. We eliminated a costly dry sand core.

2. The part will perform its function just as well as before the change.

3. The finish is much improved due to no core and absence of fins.

4. The part can be made by less experienced help at a much faster rate.

5. We were able to sell the changed part at 13.3 per cent of the price of the original casting—a saving of over $20,000 a year.

This tremendous saving is just one instance of foundry-customer co-operation.

This example can be duplicated many times if we take the time properly to evaluate each job. We must work with our customers to lower their cost or we will eventually find our work going to a foundry that will give service of this type.

They're Not Cheap—I would be remiss if I failed to urge pattern buyers to think twice before buying "cheap" pattern equipment.

No buyer would purchase mild steel cutting bits for his drill presses. He knows that his men must have high-speed steel or tungsten-carbide tools, so why do buyers so often purchase very poorly constructed "cheap" wood pattern equipment? Patterns are to the foundry what tools are to the machine shop. And to produce at a low cost we foundry people must have the best patterns possible.

Take the example of the overzealous buyer who was instructed to purchase a set of pattern equipment for a small casting. As a good purchasing agent, he asked three or four pattern shops for bids. Not knowing foundry practice he could not give definite instructions.

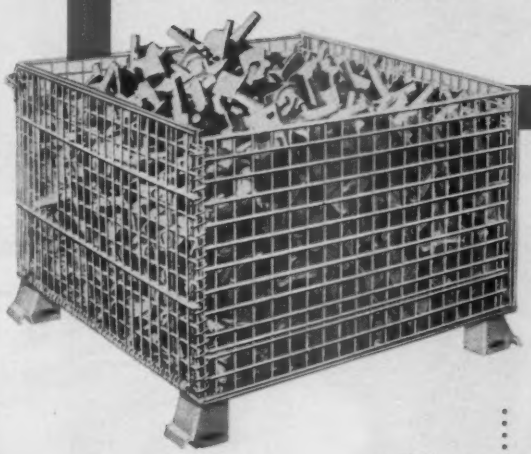
One shop bid $142.50 for a loose wood pattern and two half coreboxes. Another shop bid $410.10 for a metal matchplate of two patterns, an aluminum corebox to be used on a blower and 50 aluminum core driers.

As one would surmise, this buyer purchased the "cheap" wood equipment at an apparent cost saving of $267.60. The foundry price for the resulting casting, however, was $2.95 each. This price was so high that the engineering department checked on the reason and then purchased the metal pattern equipment quoted at $410.10. The resulting castings were priced by the foundry at $1.38 each, a saving of $1.57 per casting. This better equipment paid for itself very quickly and enabled the buyer to stay in a competitive market.

Foundrymen, engineers, and buyers should all try to understand the other's problems, and by constant co-operative consultation we can and should do a better job.

what's your..?

CARRYING CHARGE



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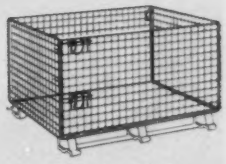
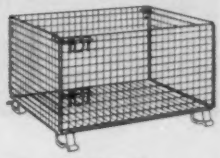
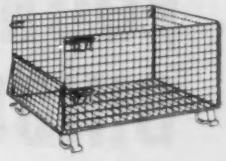


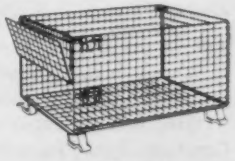
Bearing Plate



Hi-Lode



Warehouse



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Palletainers have simplified materials handling for thousands of plants in scores of industries. And, these practically indestructible containers can save you valuable time and money both in and out of your plant. Whether you're processing, storing or distance-hauling, Palletainers provide the practical answer. Available in four basic types and a broad range of practical standardized sizes. They're engineered for safer handling, ceiling high stacking, faster 8-way entry for fork truck plus the advantages of content visibility for speedy inventory.

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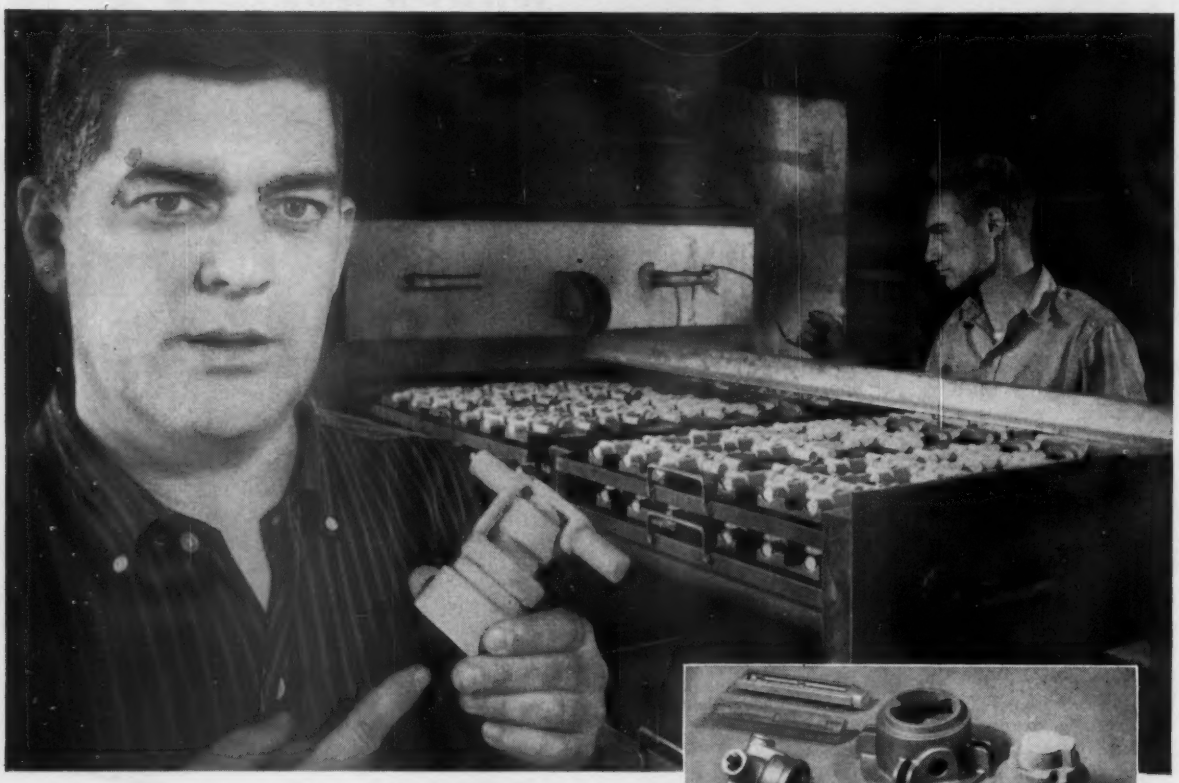
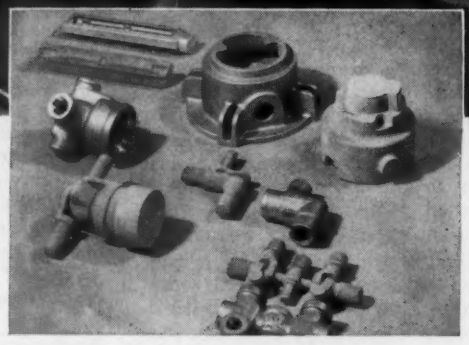




FOUNDREZ 7605 BINDER

...no smoke, drying cycle cut in half!

"Our use of FOUNDREZ 7605 *has been extremely profitable for us. Its fume-free property alone would justify its use... having solved a serious employee turnover problem."* This statement is made by Mr. William E. Virgin, factory superintendent of Samuel Eastman Company, Inc., Concord, New Hampshire.

But that's not all Mr. Virgin has to say about this Reichhold amino-aldehyde thermosetting core binder!

"In addition, by converting to FOUNDREZ 7605, *we increased our oven capacity by 75%, cut back our curing cycle by 50%, stepped up production per man-hour in the core department by 20%, reduced maintenance work on core-making equipment, reduced fuel oil cost and eliminated 85% of casting scrap caused by blows."*

You can duplicate the savings made by the Samuel Eastman Company, which has been a manufacturer of fire fighting equipment since 1824. Use RCI FOUNDREZ 7605 for core binding. Reichhold will deliver this unique liquid resin to you in tank cars, tank trucks or drums.

Write to RCI for *Technical Bulletin F-8* which gives full data on FOUNDREZ 7605.

REICHHOLD CHEMICALS, INC.,
RCI BUILDING, WHITE PLAINS, N.Y.

REICHHOLD
FOUNDRY PRODUCTS

FOUNDREZ—Synthetic Resin Binders
COROVIT—Self-curing Binders
coRCIment—Core Oils

Creative Chemistry... Your Partner in Progress RCI

Industry Briefs

DELTA Oil Products Co., Milwaukee, has been sold to Wisconsin Independent Oil Co., and its name has been changed to Delta Oil Products Corp. J. A. Gitzen, former president, has become chairman of the board, and W. T. Hansen has been elected president. No changes in personnel or activities will be made, but the firm's area of activities will be expanded.

Wehr Steel Co. and Dings Magnetic Separator Co., both of West Milwaukee, Wis., have merged. Wehr will be the surviving corporation, and Dings will be a division. C. Frederick Wehr, president of Wehr, will become board chairman, and R. L. Manegold, president of Dings, will become president of Wehr and its subsidiaries.

Utica Metals Div., Kelsey-Hayes Co., is constructing a new vacuum melting plant at a location 5 miles southwest of Utica, N. Y. To be in full production by March 1, the new facilities contain 110,000 sq ft of floor space and will cost more than $3 million.

Borden Chemical Co., division of the Borden Co., is the new name of the former Chemical Div., Borden Co. The company's chemical operations include 17 domestic and 11 foreign plants, which manufacture formaldehyde, polyvinyl chloride, resins, plastics, and other products.

Roots-Connersville Blower, division of Dresser Industries Inc., Connersville, Ind., has completed a major expansion of its main plant. The new department occupies 40,000 sq ft and will be devoted exclusively to production of type AF rotary positive blowers, type XA rotary positive gas pumps, and rotary positive displacement gas meters.

Central Foundries Inc., Denison, Tex., has been granted a charter of incorporation with capital stock of $20,000.

Durez Plastics Div., Hooker Electrochemical Co., North Tonawanda, N. Y., has opened a district sales office at Kenton, Ohio, site of its molding compounds plant. George A. Shroyer has been named district manager for the area, which includes Ohio, Michigan, and parts of Indiana, Pennsylvania, Kentucky, and Tennessee. Kenneth J. Fuoco now is in charge of the Detroit branch office.

Baker Industrial Trucks, division of Otis Elevator Co., Cleveland, and Northland Equipment Co., Detroit, its Michigan representative, have appointed Engineering & Materials Handling Industries, 487 West Forest Ave., Muskegon, Mich., as dealers for western Michigan. Arc Fabricating Co., 225 East Glendale Ave., Appleton, Wis., also has been appointed to handle Baker fork trucks and cranes.

Cecraft Mfg. Co. has been incorporated at 418 East South St., Stoughton, Wis., to manufacture patterns and other products, with capital stock of $100,000. Incorporators are Chester and Rose Mary Cich and Ben F. Peterson, all of 4040 South Brust St., Milwaukee, Wis.

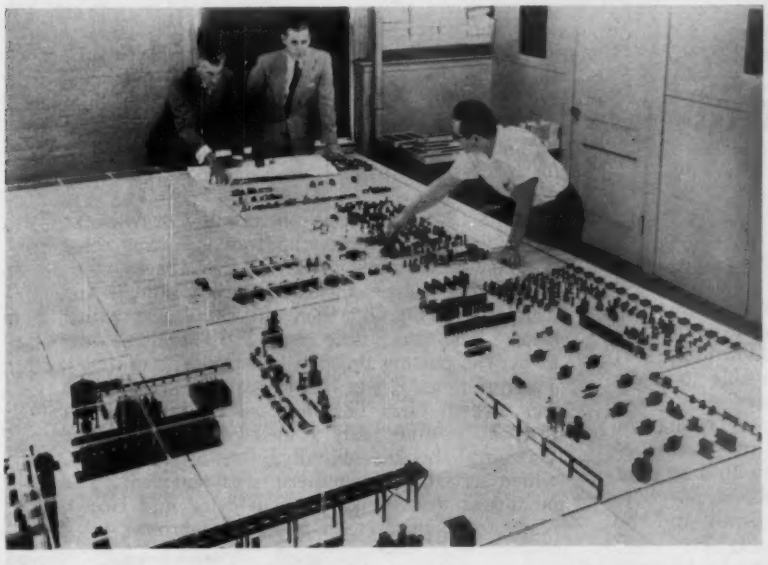
Manning, Maxwell & Moore Inc., Shaw-Box Crane & Hoist Div., Muskegon, Mich., has opened a new fabrication and warehouse facility at 8401 Mosley Rd., Houston, Tex. It covers 7000 square feet of floor space.

Beloit Eastern Corp. is nearing completion of an extensive expansion and modernization program at its plant in Downington, Pa. Several pieces of new equipment were added to the revamped gray iron foundry.

Ohio Steel Foundry Co., Springfield, Ohio, plans an $80,000 addition to its plant, to be finished by June or July. The addition will be made to the company's high-alloy foundry.

Walker Machine & Foundry Corp., Norwich, Va., is constructing a $16,000, 1600-sq-ft building to house the corporation's offices.

American Air Filter Co., Louisville, has formally completed, through an exchange of common stock, the acquisition of Kennard



SCALE MODELS AID FOUNDRY LAYOUT: Movements of these scale models are determining the flow procedure and equipment layout of the 300,000-sq-ft brass foundry being built in Braintree, Mass., by Walworth Co. The new plant will include a research and engineering center and also will replace facilities in use at the company's present Boston Works. Scale models permit Walworth engineers to make and change layouts quickly and to judge the results

Corp., St. Louis, manufacturer of heating and cooling coils and heating, ventilating, and cooling units.

Cardinal Foundry & Supply Co. has been incorporated at Cleveland with 250 shares no par common stock. H. H. Kahn, National City—E. Sixth Bldg., is agent.

Daehling Pattern Works Inc., 7752 A. West Hicks St., West Allis, Wis., has been formed with 100 shares of no par value. Incorporator is P. W. Daehling, 1210 South 73rd St., West Allis 14, Wis.

Engineered Castings Co., Longview, Tex., has begun production of gray iron castings in a 40 x 100-ft building on a 3.97-acre site in the Longview industrial park. David W. Harris, of Longview, is owner.

Valentine Div., A. P. Green Fire Brick Co., has opened its new semi-silica firebrick plant at Woodbridge, N. J. The new $1.5 million plant employs 150 people and replaces a plant almost wiped out by fire in October, 1956.

Air Flow Co., 1523 Grange St., Philadelphia, Pa., has been appointed to represent the Galland-Henning Nopak Div., Milwaukee. Air Flow Co., will handle the complete line of Nopak air and hydraulic valves and cylinders.

HOW TO DO IT

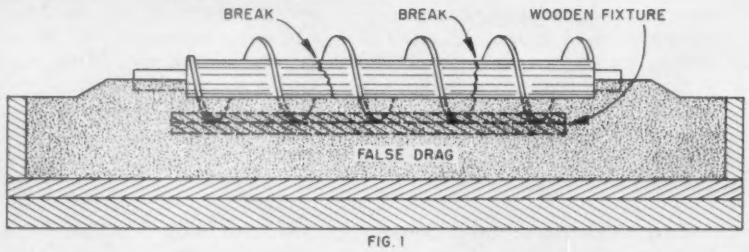


FIG. 1

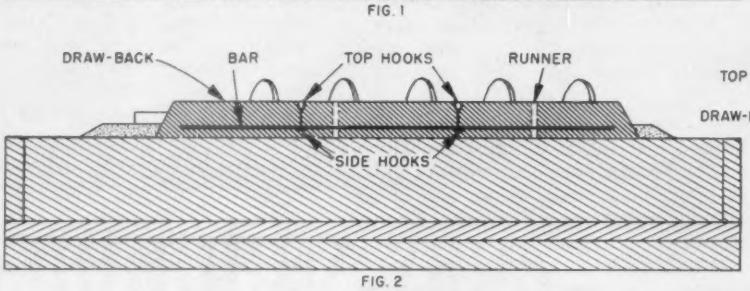


FIG. 2

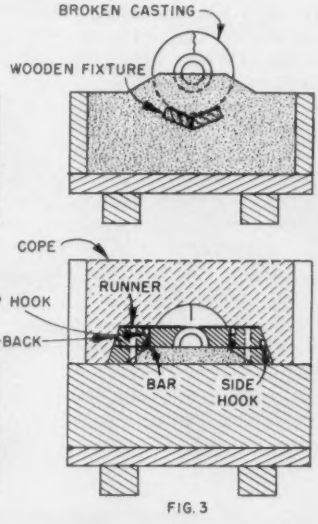


FIG. 3

Mold for Making Repair Part Uses CO_2 Process Draw-Backs

By HENRY M. GRIFFOUL
San Jose, Calif.

EMERGENCY ORDERS for making castings to replace broken parts often are a challenge to a foundryman. Such was the case with a large screw used in a cannery which had to stop production when the screw broke. Downtime was minimized when the foundry was able to make and deliver the new screw in 5 hr.

The broken screw was laid in a shallow trough fixture made by nailing two pieces of wood together. This held the screw in a straight line while it was bedded in a false drag. The green bedding sand was rammed firmly and the parting well defined as shown in Fig. 1.

Then, as shown in Fig. 2, draw-backs were rammed with sodium silicate-bonded sand on top of the false drag on each side of the screw. Each draw-back contained two vertical runners to conduct metal to the real drag and two L-shaped hooks to facilitate drawing. Rods embedded in the draw-backs helped to distribute the load on the hooks and keep them from pulling out. The top hooks carried the weight of the draw-backs, and the side hooks guided it during the draw.

The screw was rapped before the draw-backs were gassed to facilitate the draw. Parting compound was used freely over the draw-backs.

The cope was rammed with green sand in the usual way (Fig. 3) then the mold was rolled over. The false drag was lifted and thrown away, the parting finished and the drag rammed. Then the mold was rolled over again, and the cope drawn off. The draw-backs were lifted a little at a time with a backward pull on the horizontal hooks. Finally, the broken screw, which served as the pattern, was removed. The mold was dressed, gated, skin dried and closed, ready for pouring with manganese bronze.

Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

Here's *real* high production! Pictured above is a 4-part core box. Combination vertical and horizontal parting fixtures open and close the box in 4 directions and eject finished shell core complete, ready for immediate use.

With the
AUTOMATIC

"BLO-CORE" SHELL MACHINE

Outstanding "BLO-CORE" Features:

- Core boxes up to 15" x 20" x 30" high
- Mold boxes up to 20" x 30" x 16" draw
- Horizontally-parted Mold Boxes
- Vertical-split Core Boxes
- 4-part draw split Core Boxes
- Two station Rotary Operation. NO OVENS

Write today for full particulars on "BLO-CORE" Model HI-1824. Ask for Bulletin CS-57.

C&S PRODUCTS COMPANY, Inc.

AFFILIATED WITH Barber-Greene

18656 FITZPATRICK DETROIT 28, MICHIGAN, U.S.A.

CEDAR HEIGHTS BONDING CLAY
A plastic bonding agent produced in No. 8, 12, 16 20, 30, and 50 meshes.

CEDAR HEIGHTS AIRFLOATED CLAY
Highly refined, artificially dried. Ground to 200 mesh.

CEDAR HEIGHTS FIRE CLAY
High in refractory value, smooth clean texture. Produced in No. 8, 12, 16 and 20 meshes.

for better castings

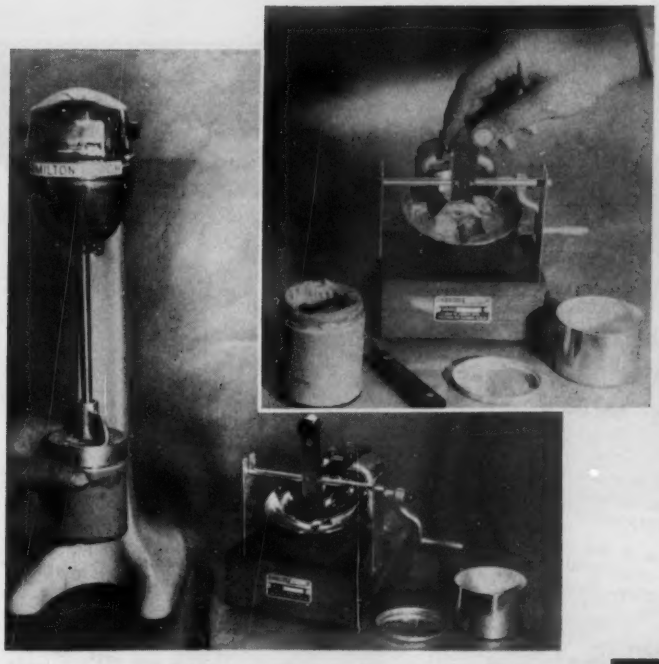
. . . start with clean molds made with sand containing superior Cedar Heights bonding agents.

These super-refined clays from the world's finest clay deposits help to produce molds with higher green strength . . . higher dry strength with a minimum of shrinkage . . . higher hot strength.

Castings peel clean with a fine finish . . . have fewer pinholes . . . less rejects.

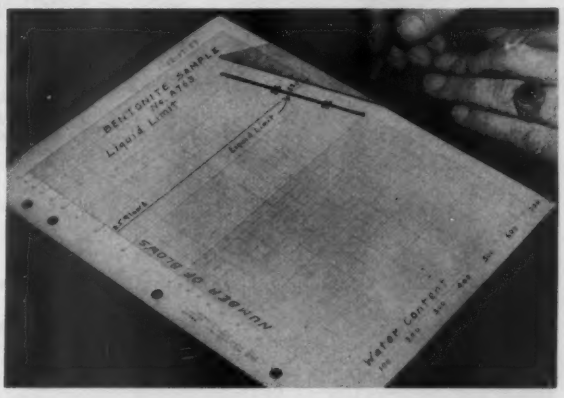
For proof of Cedar Heights quality and performance make a test mold in your own laboratory or foundry operation. Contact your distributor or write for free test samples.

CEDAR HEIGHTS CLAY COMPANY
50 PORTSMOUTH ROAD
OAK HILL, OHIO



Left—Principal equipment used in determining the liquid limit of bentonite. *Center*—Cutting groove in the slurry with scribing tool. *Right*—Jolting slurry in test pan to close the groove

Chart of two tests gives reading for liquid limit (Photos courtesy of the Unitcast Corp., Toledo, O.)



New Testing Method Included in Western

BENTONITE SPECIFICATION

A TENTATIVE specification for users of western bentonite, one of several issued or in course of preparation by the Specifications Committee of the Steel Founders' Society of America (see January FOUNDRY, p. 128), includes the use of a newly developed procedure and testing apparatus for determination of the material's liquid limit.

Technical Requirements—Bentonite properties covered and values fixed by the specification (SFSA Designation: 13T) include these:

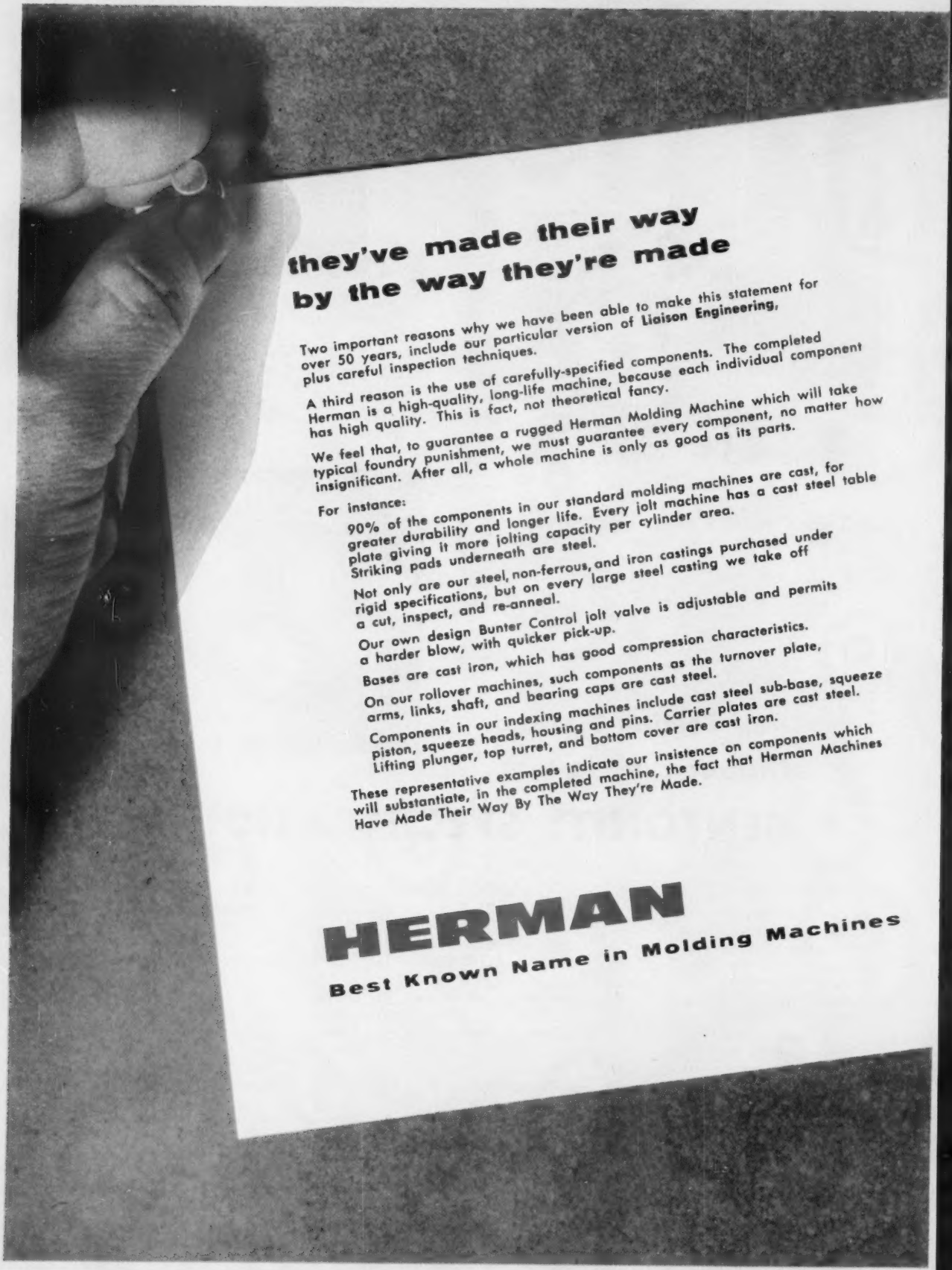
1. Moisture—6 per cent minimum, 12 per cent maximum.
2. pH value—8.2 or higher.
3. Calcium oxide content—not more than 0.70 per cent.
4. Liquid limit—not less than 525, with no maximum value specified.

Methods of determining the above values are spelled out in the specification. The method for liquid limit testing was developed for the society at Massachusetts Institute of Technology during the course of research studies on clays for binding steel foundry sands. Apparatus required includes a high-speed mixer for preparing the slurry and a device for grooving and jolting the sample, as shown in the accompanying illustrations.

Liquid limit is defined as the water content of a mixture requiring 25 blows or jolts of the test cup to close the groove made by the scribing tool. Water content is the weight of water in the slurry, divided by the weight of the bentonite added to the slurry, times 100.

The water content for 25 blows is determined by plotting on a semilogarithmic chart the water content vs. the number of blows required for two different slurries — one in the range of 9 to 20 blows, the other 30 to 40. From a line drawn between the two points, a reading for the 25-blow line can be taken. In the case illustrated here, the two tests required 17 and 30 blows, respectively. Corresponding water contents were 660 and 615. A connecting line intersects the 25-blow line at 630, which is the liquid limit.

Equipment used in this test may be purchased from Soiltest Inc., 4711 West North Ave., Chicago 39, Ill. Copies of the complete specification are available from the Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio, for 25 cents each.



they've made their way by the way they're made

Two important reasons why we have been able to make this statement for over 50 years, include our particular version of **Liaison Engineering,** plus careful inspection techniques.

A third reason is the use of carefully-specified components. The completed Herman is a high-quality, long-life machine, because each individual component has high quality. This is fact, not theoretical fancy.

We feel that, to guarantee a rugged Herman Molding Machine which will take typical foundry punishment, we must guarantee every component, no matter how insignificant. After all, a whole machine is only as good as its parts.

For instance:

90% of the components in our standard molding machines are cast, for greater durability and longer life. Every jolt machine has a cast steel table plate giving it more jolting capacity per cylinder area. Striking pads underneath are steel.

Not only are our steel, non-ferrous, and iron castings purchased under rigid specifications, but on every large steel casting we take off a cut, inspect, and re-anneal.

Our own design Bunter Control jolt valve is adjustable and permits a harder blow, with quicker pick-up.

Bases are cast iron, which has good compression characteristics.

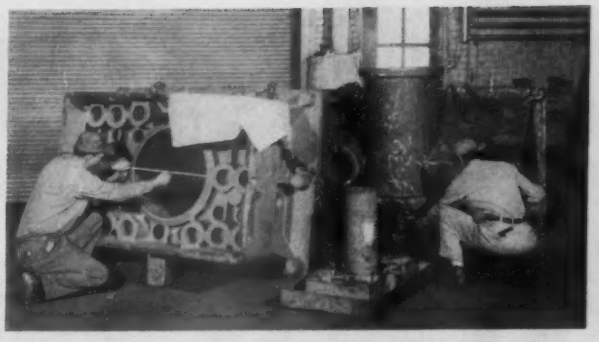
On our rollover machines, such components as the turnover plate, arms, links, shaft, and bearing caps are cast steel.

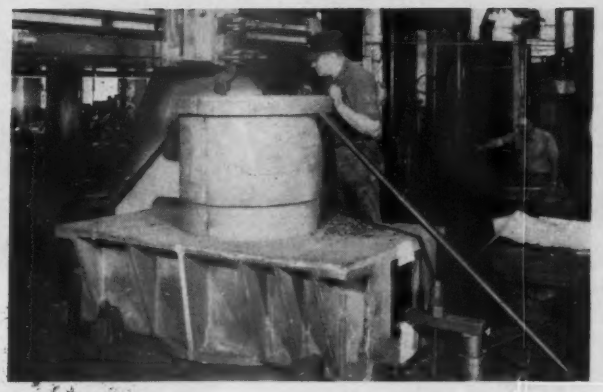
Components in our indexing machines include cast steel sub-base, squeeze piston, squeeze heads, housing and pins. Carrier plates are cast steel. Lifting plunger, top turret, and bottom cover are cast iron.

These representative examples indicate our insistence on components which will substantiate, in the completed machine, the fact that Herman Machines Have Made Their Way By The Way They're Made.

HERMAN

Best Known Name in Molding Machines





HERMAN PNEUMATIC MACHINE CO.,
UNION BANK BUILDING, PITTSBURGH 22, PA.

Circle 625 on Page 51

News Views

CORE SHOOTER: Fritz Hansberg, Modena, Italy, inventor of the Hansberg shooter for which U. S. manufacturing and sales rights are held by Davenport Machine & Foundry Co., recently was in this country. Above he is operating a shooter at the Frank Foundries Corp., Moline, Ill. Others, left to right, are W. A. Geisler, Davenport Foundry Equipment Div. sales manager, George C. Schebler and George Phillips, Chevrolet-Saginaw Grey Iron Foundry Div., GMC, Saginaw, Mich.

FOUNDRY VETERAN: Vincent Jobson, chairman and managing director, Qualcast Ltd. of England, recently completed 53 years in the iron foundry industry. The British Council of Ironfoundry Associations marked the event and Mr. Jobson's long service on its executive bodies with a presentation in London on Jan. 23. It was made by N. P. Newman (right), chairman of the council. Mr. Jobson, 71, is still fully active in the control and direction of his companies.

PAST PRESIDENTS: Chicago Chapter of AFS recently honored these ten past presidents. Left to right: James Thomson, Harold Johnson, L. H. Rudesill, W. D. MacMillan, C. V. Nass, John Owen, J. A. Rassenfoss, R. L. Doelman, J. T. Moore, R. P. Schauss

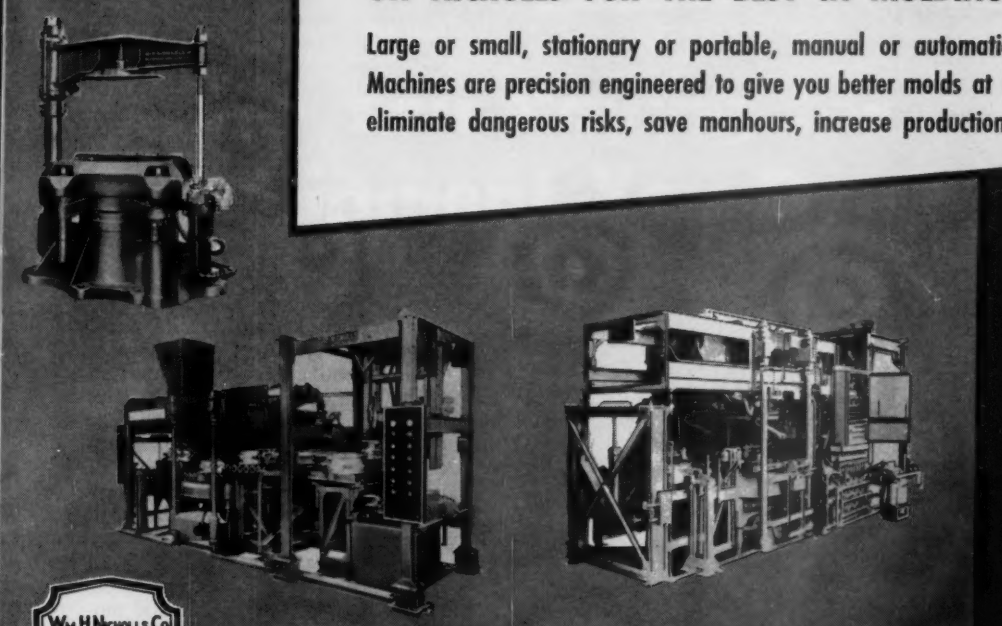
NEW PLANT: Link-Belt Co. officially opened this new Los Angeles plant recently. It more than doubles former capacity for manufacturing material handling equipment, also houses engineering and district sales offices, and a branch store. It has 92,000 square feet of floor space.

Circle 626 on Page 51→

- Accurate, uniform molds . . . true to pattern . . .
- Smooth, sensitive operation . . . dependable performance
- Long life
- Low upkeep
- Simple controls
- Push button or manual operation
- Automatic Jolt & Squeeze timing
- Permanent alignment
- Forced lubrication
- Sections heavily ribbed for added strength
- Guide pins and bushings steel hardened and ground
- Pneumatic pattern draw

FOR HALF A CENTURY MANUFACTURERS HAVE DEPENDED ON NICHOLLS FOR THE BEST IN MOLDING EQUIPMENT.

Large or small, stationary or portable, manual or automatic, Nicholls Molding Machines are precision engineered to give you better molds at lower costs . . . to eliminate dangerous risks, save manhours, increase production.



On Automatic Machines

- Air-operated car-type squeeze heads
- Built-in flask, roll-in roll-out device
- Measuring sand hopper
- Flask feed-in elevator
- Flask indexing device
- Sand spill upset
- Mold turnover and transfer

WM. H. NICHOLLS CO. INCORPORATED RICHMOND HILL, L.I.N.Y. BUILT BY NICHOLLS THE SIGN OF EFFICIENCY

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WM. H. NICHOLLS CO., INC. • Richmond Hill 18, L. I., N. Y.

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VIrginia 9-0064

Man to Man

By RALPH L. LEE, *President*

Lee Hobby Foundry
Birmingham, Mich.

"No man can even begin to do his detailed, routine tasks as they should be done until he is recognized properly as an individual"

Thoughts about the Anonymous "They"

IT'S BEEN pretty much nip and tuck here at the Lee Hobby Foundry. There are so darned many interruptions! Between telephone calls, must-letters to be answered, and out-of-town speeches to make, things get rather hectic. But, even so, the one-man organization manages to get out some castings, and, if I do say it myself, some pretty good ones. Last night at 11 o'clock, after a trip to Salt Lake City, I finished the last of a lot of 21. Outside of a little dirt in an inconspicuous place on one of them, they turned out very well.

I haven't quite figured out what happens when I get home after hours of sitting in a plane, pretty well pooped out from shaking hands with everybody and his uncle at a convention, making a speech, listening, and philosophizing. But let me get up there in the Lee Hobby Foundry, and suddenly I feel the thrill of life along my keel (Longfellow). The hands of the clock go around like crazy, and the next thing I know, the intercom buzzes and Mother (that's Mrs. Lee, chairman of the board) says, "For heaven's sake, aren't you ever going to bed?"

Depends on the Viewpoint — Shoveling the heap of sand over three or four times isn't what you'd call romantic, getting in the bottom boards lacks sex appeal, lining up the jackets and weights might be called plain unadulterated labor, and so could loading the pot with metal, lighting the furnace, molding, pouring, shakeout, and cleaning. But they aren't to me, for they all are necessary to a good cause, one in which I'm very much interested. In addition, I like to exercise what little knowhow and skill I have in this mysterious and intriguing field of founding.

Although I frequently am called a foundry fanatic, I don't believe that my enthusiasm would continue at its present high level if my work in the Lee Hobby Foundry were limited to shoveling sand or to any single one of the many, indispensable operations involved in making castings.

And let's say that if conditions beyond my control forced me to become a sandman exclusively, I might manage to hold on if enough latitude was given me for using my judgment, making a few mistakes, or distinguishing myself by coming through in a pinch. But hamstring me as far as choice is concerned and lock me into some sort of synchronous, motor - controlled, system - bound, button-pushing sentinal spot, and I'd go plumb goofy inside of a week.

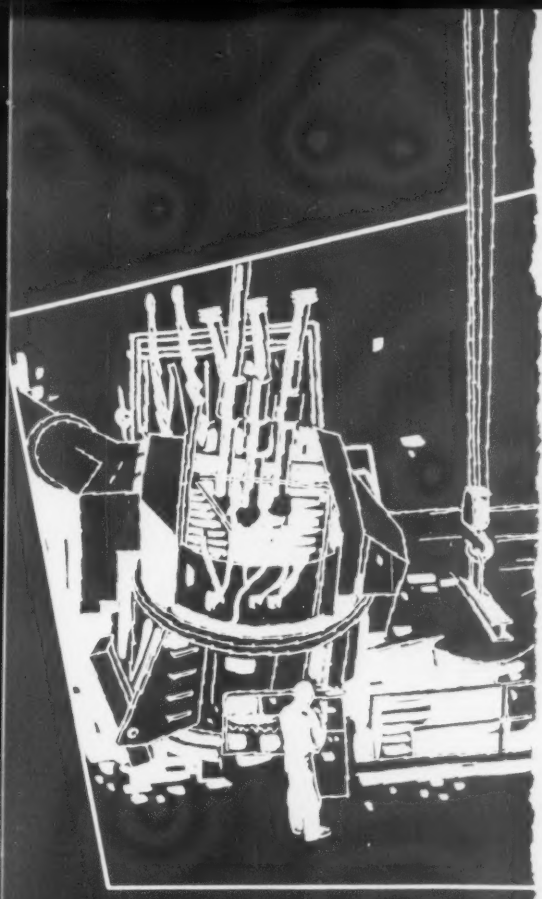
Faced with an order for castings to make and wholly absorbed in all of the operations required, both interesting and routine, I can see the number I still have to make going down as the number I've finished builds up—an unmistakable measure of my accomplishment—either a fair, good, or excellent accomplishment, but mine, by heck, and only mine.

"A man's a man, for a' that"

Monotony a Culprit — I don't think there is any question that barely sufferable monotony is the hidden and underlying cause of a great deal of our labor relations shenanigans. At least, it fertilizes the ground for their thriving. On the other hand, we are likely to think, "But hold on a minute, boy, we mustn't forget that all people aren't alike. They like to have everything all set for them; they like routine." I don't think there is any question of this being the case, but no one knows just where the point of diminishing returns on the monotony curve is for each individual.

A wholly inaccurate guess as to the proportion of folks who thrive on monotony certainly could put a department or an organization at a terrific disadvantage in comparison with those operated on the basis of facts. And to ignore the possibility of a production-throttling, scrap-producing (both kinds) point of diminishing return on the monotony curve could be almost foolhardy it seems to me.

Here is an area wholly within our hands as we go about our labor-saving business. Our time and motion study boys—and all power to them—and our quality control technicians—and all power to them also—are hired to split hairs in the breaking down of our essential operations into foolproof fragments.



Announcing

FOUNDRY's MAY Pre-Convention Issue*...

Including a timely EDITORIAL FEATURE PACKAGE entirely devoted to the theme . . .

Are You Paying for Equipment You Don't Have?

- A discussion: When (from the foundryman's standpoint) is the time to replace old equipment in the interest of cost savings and how is this done?
- Ideas and suggestions on good replacement policy and practice (from the equipment-maker's viewpoint).
- Case histories citing dollar savings when new equipment is installed by foundries to replace obsolete facilities as well as old, worn-out equipment.
- An engineering analysis into all phases of one foundry's operations with a description of how changes will pay for themselves in a short period of time by cutting production costs.

* . . . . . to be distributed to more foundrymen than any issue in our 66 years of serving the industry: Over 20,000 copies! Issue will be mailed April 30, 1958 and distributed at the Cleveland AFS Castings Congress and Foundry Show, May 19-23.

- Pictorial review of new and improved foundry equipment to be seen at this year's Show.
- Convention Program and highlights of the meeting.
- Medal Award Winners.

Feature Stories and Regular Departments

Late News insert, Questions and Answers, selected feature stories on technical foundry subjects and regular departments will appear as usual.

AMERICAN FOUNDRYMEN'S SOCIETY
Castings Congress and Foundry Show
Cleveland Public Auditorium
May 19 to 23, 1958

Coming in July—FOUNDRY's Annual Post-Convention issue . . .

The news and technical story of the Cleveland convention and technical sessions will be special features of the July Post-Convention issue of FOUNDRY

FOUNDRY A PENTON PUBLICATION • PENTON BUILDING • CLEVELAND 13, OHIO

Salesmen-students apply themselves to examination on material covered by clinic

GIFS Sponsors Sales Training Clinics

Left to right, R. C. Meloy, GIFS marketing director; W. E. Burton, sales manager, Canada Iron Foundries; J. E. Detzel, sales representative, General Electric Co.; Harry Aldrich, sales engineer, Springfield Foundry

THE first of eight regional, three-day sales training clinics for gray and ductile iron castings salesmen was held Jan. 8-10 at the Hotel Carter, Cleveland. Castings salesmen from seven midwest states and Canada participated.

Sponsored and conducted by the Gray Iron Founders' Society, the clinics were designed to upgrade both new and experienced salesmen in the arts of progressive selling of gray and ductile iron castings.

Subject matter covered includes Metallurgy and Properties of Gray and Ductile Irons; Design of Castings; Pattern Equipment; Competitive Materials and Processes—Relative Costs; Cost Systems; Preparation and Approach in Making a Sale; How to Overcome Objections; and How To Plan Sales Time.

Instructing the clinics were two Gray Iron Founders' Society staff members—Charles F. Walton, technical director, and Richard C. Meloy, marketing director.

The Cleveland clinic was the first of a series scheduled during January and February in Philadelphia, Chicago, Milwaukee, St. Louis, Hamilton, Ont., and San Francisco. The final session will be held Mar. 3-5 in Cincinnati at the Gibson Hotel.

Individual classes were limited to 20 men to encourage maximum participation, and only 40 applications were accepted for each clinic.

But I'm not so sure that their technical handbooks contain reliable data as to the monotony curve or the increased productivity that can come solely from the down-inside feel of letting oneself go all out.

Only One of His Kind—I would be silly to ignore the fact that mechanization is here to stay, but it also in my opinion is downright silly to think that anyone can do his best without some opportunity for distinguishing himself as a separate and distinct individual. Of one thing we may be sure: No matter how humble the task he performs, or how readily he can be replaced, he can't even begin to do his detailed and routine tasks as they should be done unless he regularly is recognized by his powers that be as, for example, Joe Cazinski, the only one of his kind in all the world. Employee No. 377 on the night shift, a member of the group referred to as "They," will not do.

Sometimes it almost makes a fellow weep when he thinks of a gang living under the same roof, spending more time together than they spend anywhere else, actually rubbing shoulders together, yet in sort of an armed truce with a wholly imaginary fence running down through the place with those on either side thinking of and referring to those on the other hand as They. It just isn't natural; it's downright artificial.

Foundry Progress Cited in

CASTING DESIGN CONFERENCES

Elmer Braun, works manager, welcomes visitors to the conference

CENTRAL Foundry Division of General Motors Corp., through a series of conferences, is giving designers and users of castings a better understanding of how cast components can be used most effectively.

Speakers at the conferences explain the most economical and effective ways of designing castings and describe the significant new developments in foundry practices. Invitations to conferences held to date have attracted an enthusiastic response and capacity audiences.

The series of one-day meetings was inaugurated last December at the Saginaw Malleable Iron Plant, Saginaw, Mich., and is being continued there into this year. Later, similar conferences are planned to be held at the Defiance, Ohio, and Danville, Ill., foundries for customers in the marketing areas of those plants.

According to Central Foundry Division officials, the strong interest being shown in the conferences indicates a definite need for a better understanding among consumers of modern foundry techniques and processes. They feel that the information developed at the sessions will result in an improved working relationship between customer engineers and foundry engineers which can be translated into quality improvement and cost savings.

Elmer E. Braun, Central Foundry Division works manager, has been program chairman of the first conferences at Saginaw. He has been assisted by members of the Saginaw staff in the presentation of seven talks and in a guided tour of the foundry. Following are subjects covered in the discussions:

Foundry Terms, Molding Methods and Castings Procedures, by George A. Hach, product development engineer. This talk is an orientation for those not familiar with foundry operation. It covers basic foundry terminology and molding methods, types of equipment

Visiting the Experimental and Development Dept. and its stress analysis laboratory. John L. Flitz explains stress analysis use in design work

Part of the audience, which heard talks on casting design and use

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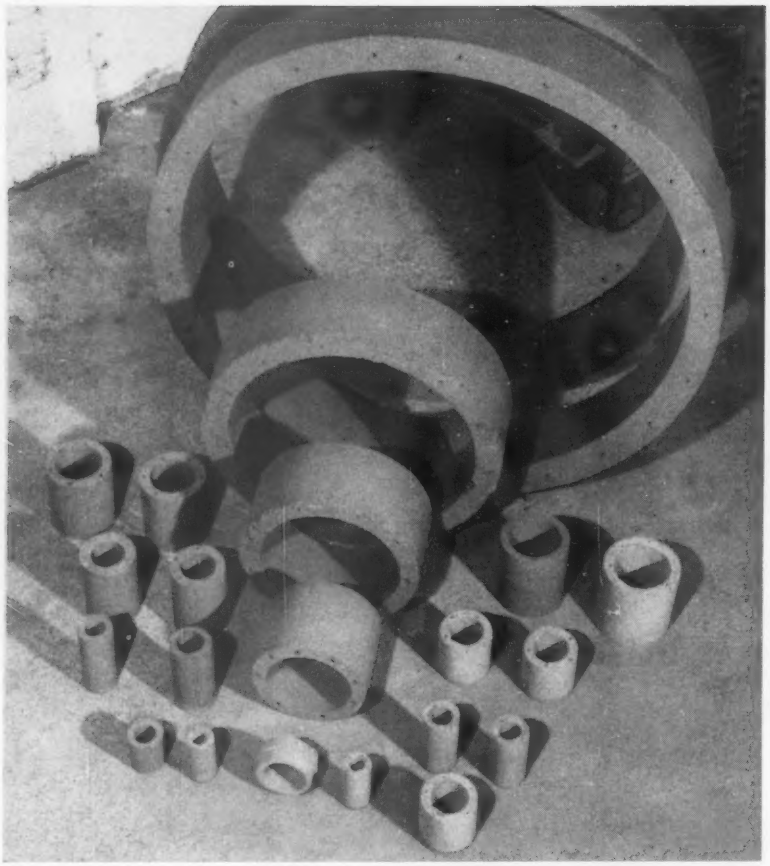
Circle 627 on Page 51



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used at Central Foundry, and the company's method of engineering, pricing, and getting equipment ready for production.

Use of Cobalt 60, by D. F. Richter, superintendent, experimental and development department. Emphasis is placed on use of radiography to improve gating and feeding systems, thereby improving casting quality and reducing production costs.

Fundamentals and Examples of Design Improvements, by John L. Flitz, product development engineer. Suggestions are offered the design engineer on many ways in which it is possible to reduce the cost of a casting through proper design.

Selecting the Best Iron for the Job, by Carl F. Joseph, technical director. This talk covers the wide range of physical characteristics and properties available in gray iron and malleable iron and the need for careful selection for a proposed application. It includes a description of Central Foundry's newest type of pearlitic malleable iron. This recently introduced grade, known as ArmaSteel 88 M, was developed to provide a material having higher strength and wear resistance, plus good machining characteristics. It has a tensile strength of 105,000 psi, minimum yield of 85,000 psi, and minimum elongation of 2 per cent. In several automotive applications it has replaced alloy steel forgings.

When To Use Shell Castings, by C. D. Evans, product development engineer. Examples are presented of the types of castings best adapted to production by the process and cases in which its use is not warranted.

Plus or Minus Tolerances, by Harold G. Sieggreen, chief engineer. Normal casting tolerances which can be met are explained, together with a discussion of how the designer can help prevent or minimize variations in casting dimensions.

Aluminum Association Elects Officers at Annual Meeting

S. D. Den Uyl, president, Bohn Aluminum & Brass Corp., Detroit, was re-elected president of the Aluminum Association at its recent annual meeting in New York. Everett G. Fahlman, president, the Permold Co., Medina, Ohio, was re-elected chairman of the board.

Elected directors at large for three years were: Irving Lipkowitz, assistant to the president, Reynolds Metals Co., New York, and Louis Lippa,

president, Apex Smelting Co., Chicago. D. A. Rhoades, vice president-general manager, Kaiser Aluminum & Chemical Corp., Oakland, Calif., was re-elected to a three-year term as director at large.

Frederick A. Merliss, United Smelting & Aluminum Co., New Haven, Conn., was elected a vice president. Two other association vice presidents were re-elected: Russel B. Caples, president, Anaconda Aluminum Co., New York, and Frank R. Nichols, president, Nichols Wire & Aluminum Co., Davenport, Iowa.

The association's five active commodity divisions also held sessions and elected officers during the three-day meeting.

In meetings of the Foundry Division J. E. Fahlman, executive vice president, the Permold Co., Medina, Ohio, was elected chairman; Arthur L. Fischer, president, Fischer Casting Co., Dunellen, N. J., was named vice chairman, and Edward C. Bloomberg, president, Monarch Aluminum Mfg. Co., Cleveland, was re-elected division representative on the association's board of directors.

New Abrasives Society Plans To Expand Its Activities

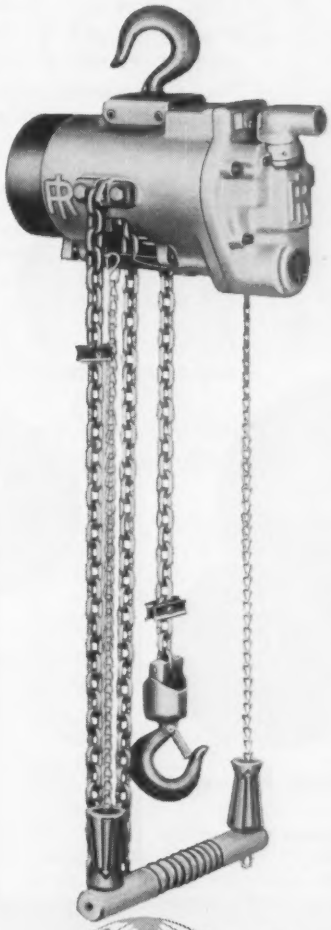
Membership of the American Society for Abrasives has grown to more than 500, it was revealed at its first annual meeting held in New York recently. An independent technical association dealing solely with abrasives, it was organized in November, 1956.

The society plans to establish chapters in Cleveland, Chicago, and St. Louis, supplementing eight now operating in Connecticut, Boston, Reading, Pa., Pittsburgh, western Michigan, Detroit, northern New Jersey, and Long Island.

Officers are: National chairman, Ted J. O'Connell, Macklin Co., Jackson, Mich.; president, John Y. Arnold, Carpenter Steel Co., Reading, Pa.; vice president, Raymond E. Ryder, General Electric Co., Lynn, Mass.; secretary and general counsel, Jan L. Deelman, Reading, Pa.; treasurer, Willard J. Miller, Reading, Pa.

Organized "to encourage and foster the study, uses, application, and improvement of abrasives," the society also seeks to encourage understanding and association between makers and users of abrasives. It contemplates development of a research department, uniform standards for abrasives, and training programs.

new LIGHT weight
LOW-HEAD
AIR HOISTS

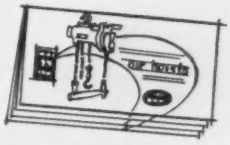


Unequalled for tough jobs, these hoists are unaffected by hot, corrosive, or wet atmospheres and are explosion and shock proof.

They are available in two capacities. The ½-ton size weighs only 39 lbs., and the 1-ton size weighs only 55 lbs. Fully-loaded lifting speeds are 40 fpm and 20 fpm respectively, and both units are available with either link or roller chain.

Ask your Ingersoll-Rand AIR-engineer to demonstrate these new "light weight leaders" in the complete line of Ingersoll-Rand air hoists from 200 lbs. to 24,000 lbs. capacity. Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

Send for free copy of new Lightweight Air Hoist Bulletin Form 5224.



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Circle 647 on Page 51

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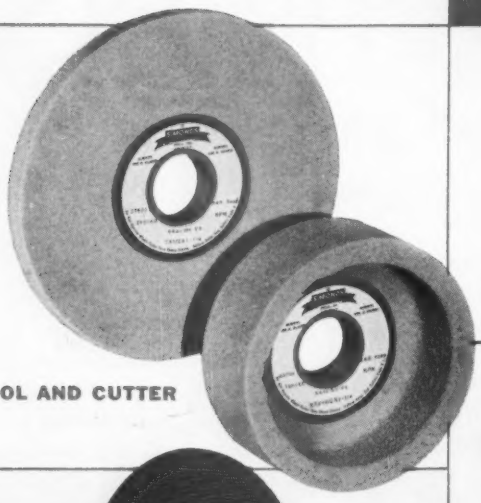
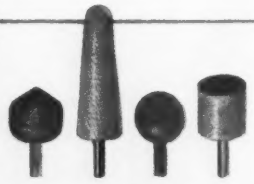
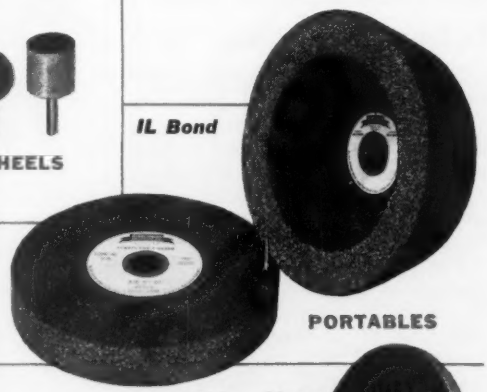


TOOL AND CUTTER



MOUNTED WHEELS



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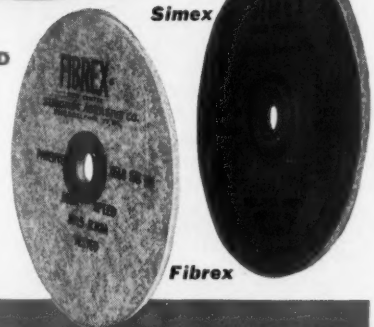

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Circle 630 on Page 51

FOUNDRY EQUIPMENT AND SUPPLIES DIGEST

For More Details on These Items Use Reply Card — Page 167

CO_2 SAND MULLER

Muller operates without springs, rollers, or wheels and is reported to provide a thorough, gentle action which saves up to 30 per cent of binder. Capacity loads are mulled

within 76 seconds after introduction of binder.

Construction of the Rapid Muller, with only one rotating part, assertedly minimizes cleaning and maintenance problems. Unit weighs 900 lb and occupies 7 sq ft of floor space. All parts are housed in the base. Six sizes are available, in capacities from 15 to 1200 lb.—**Carver Foundry Products Corp.**, Muscatine, Iowa.

For More Details Circle No. 401—Page 167

DISC FILING MACHINE

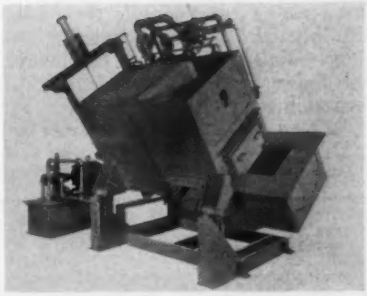
Disc filing machine is said to provide quick, accurate removal of metal, wood, and plastics. It may be equipped with two discs at one time, ranging in size from $3\frac{1}{8}$ to 12 in., and discs are available in many different cuts. All come with ground teeth which may be resharpened by grinding.

The worktable of the unit provides for mounting fixtures or special sliding tables for special operations. Deburring operations can be accomplished quickly with negligible handling, it is claimed. A 1-hp motor turns discs at 175, 250, 310, 370, and 410 rpm.—**Jersey Mfg. Co.**, Livingston St., Elizabeth, N. J.

For More Details Circle No. 402—Page 167

TILTING FURNACES

New line of nose-pour furnaces is available with hydraulic tilting mechanism. Furnaces are designed for use when large sand castings are poured or when molten metal is to be transferred to either a holding furnace or a large ladle. All are of double-chamber, dry-hearth design. Capacities available are 600, 750, 1000, and 2000 lb per hour. Larger sizes usually are



equipped with the hydraulic tilting mechanism and can be provided with dipout vestibule in addition to pouring spout.

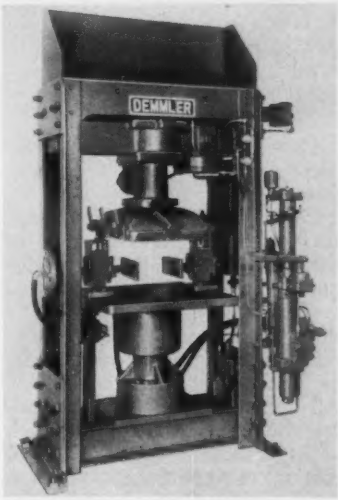
Because cold metal never is charged into the dry hearth, there is said to be no gassing or overheating of metal. Holding bath temperature is sensed by a thermo-

Machine Blows or Shoots Any Type of Core

Demmler 70 is a heavy duty, high-speed production coreblower-shooter. It blows or shoots any type of core in weights from a few ounces to 10 lb, into either wood or metal coreboxes. The unit features a sleeve-type stationary magazine with special slot design to provide efficient operation.

One push of the operating lever puts the machine through a complete cycle. Diaphragms for the blow valve can be replaced easily. The blow plate has a quick-change feature, and the shoot heads are interchangeable in seconds without the use of wrenches. The 6-in. draw stroke originates from a fully enclosed draw mechanism said to be maintenance-free.

A safety device is used to make the entire machine inoperative unless the corebox is located



properly. — **Demmler Mfg. Co.**, Kewanee, Ill.

For More Details Circle No. 440—Page 167

couple in the dipout vestibule and is controlled within close limits. Molten metal from the dry hearth enters the holding bath in a continuous trickle at the same temperature as the bath.—**Combustion Div., Eclipse Fuel Engineering Co.**, Rockford, Ill.

For More Details Circle No. 403—Page 167

ALUMINUM ALLOY PIG

Aluminum standard alloy pig now is available in two new small sizes, 10 lb and 30 lb. The new sizes are available, like the regular 50-lb alloy pig, in the following alloys: 2312, A2312, 2393 and 2364. They are intended particularly for users who cannot handle the 50-lb size because of equipment limitations.—**Kaiser Aluminum & Chemical Sales Inc.**, 919 N. Michigan Ave., Chicago 11, Ill.

For More Details Circle No. 404—Page 167

MARKING NAILS

Marking nails are made to order for such purposes as marking patterns, identifying company property, indicating installation dates, distinguishing products, and other uses.

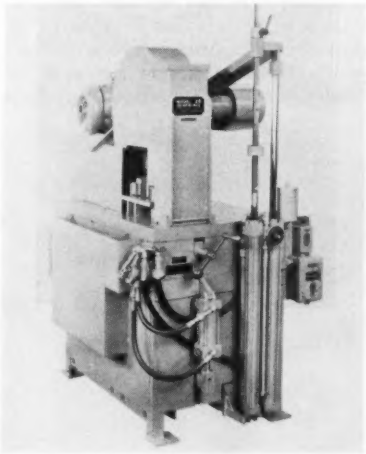
Heads can be imprinted with a number, a letter, or a combination of each, either raised or depressed. Large nails can be supplied with an outer rim on the heads to protect the marking.

Suggested sizes range from No. 12 gage (0.105 in. in diam) to 5/16 in. in diam. Suggested head diameters range from 5/16 in. on the No. 12 gage nail to 1 in. on the 5/16-in. nail. Lengths can run from 3/8 to 7 in., respectively.—**John Hassall Inc.**, Westbury, Long Island, N. Y.

For More Details Circle No. 405—Page 167

DRY-ABRASIVE CUTTER

Model 28 Sever-All dry-abrasive cutter is claimed to provide high cutting capacity for a wide range of materials, including almost any metal. The unit is equipped with a heavy duty, 10-hp, 3600-rpm motor which provides spindle speed of



2450 rpm. It can handle solid steels up to 4 in. square, 6-in. angles, 8-in. channels, and 4-in. OD pipe or tubing at 90 degrees to axis.

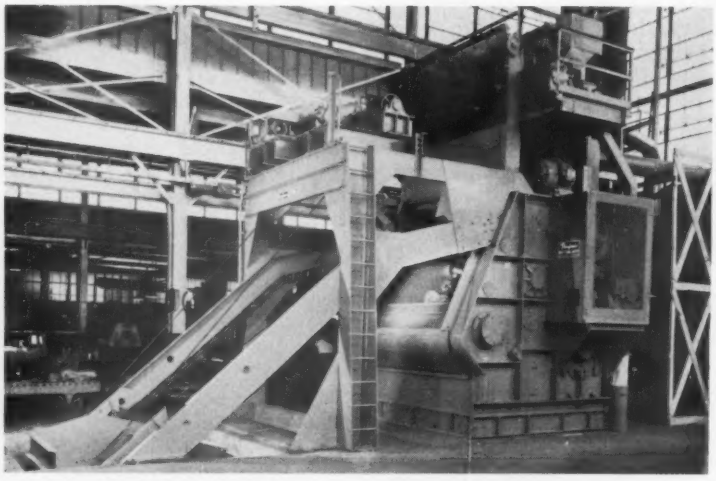
Available in both portable and stationary models, the cutter is basically an oscillating-type unit in which the wheel and workpieces are fed manually by the operator. The wheel is lowered with a hand lever. With oscillation, the amount of abrasive wheel contact is reduced, and cutting is performed with minimum wheel pressure and without burn at a rate of 2 to 5 seconds per square inch. — **American Chain & Cable Co.**, 929 Connecticut Ave., Bridgeport 2, Conn.

For More Details Circle No. 406—Page 167

DRUM SANDER

Cone-Loc drum sander permits use of ordinary strips of coated abrasive rather than endless belts. Abrasive strips can be wrapped quickly and easily around the sander, hooked over pins, and locked into a solid abrasive drum. Easy interchange of coated abrasive

Blast Barrel Cleans 6-Ton Load in 5 Minutes



New 72-cu-ft Rotoblast barrel blast cleans loads weighing up to 6 tons in 5 minutes. The 72 Type GN barrel is equipped with two wheels, each capable of throwing 120,000 lb of abrasive per hour. Each wheel is powered by a 40-hp motor, and heavy duty motors also are used to power the shaker conveyor, barrel door, and abrasive elevator. All operations are conducted automatically from a control panel.

To handle large, individual castings weighing more than a ton each, these barrels are equipped with an apron work conveyor of 1½-in. thick steel slats. Only two supporting chains are used. Inaccessible center chains have been eliminated to reduce maintenance costs.

A solid-plate, abrasive-tight door eliminates abrasive losses and permits economical use of premium quality abrasives. Wheel housings and blast chamber are lined completely with replaceable Wear-Resist alloy plates, and drum ends are manganese steel. The recleaning, abrasive cleaning system removes all sand and debris and maintains full abrasive efficiency. The barrel is 21 ft 5 in. wide, 10 ft 11 in. deep, and 23 ft high. — **Pangborn Corp.**, Hagerstown, Md.

For More Details Circle No. 441—Page 167

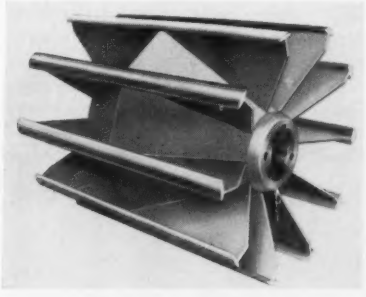
in grits from coarse to fine facilitates use of the single tool for all stages of metal removal, grinding, and polishing.

A cone-shaped locking washer keeps halves together during operation. The device is reported to be completely safe at speeds up to 6000 rpm, and it is said to function without bump or irregular grinding action. Various sizes are available for different applications. —**American Diamond Saw Sales,** 120 N.W. Ninth Ave., Portland 9, Oreg.

For More Details Circle No. 407—Page 167

CONVEYOR PULLEYS

Self-cleaning steel conveyor pulleys are available immediately in 3000 standard sizes and according to individual specifications. Sizes



range from 8 to 60-in. diam, 8 to 66-in. face width, and ½ to 10-in. bores. Made with Dodge Taperlock bushings, they are said to insure longer belt life because the self-cleaning cone design eliminates material buildup between belt and pulley and prevents belt misalignment. The outer edge of each individual wing is protected by a half-oval bar which reduces belt strain and provides maximum traction.—**Van Gorp Mfg. Co.,** Box 123, Pella, Iowa.

For More Details Circle No. 408—Page 167

BANTAM AIR HAMMER

Bantam Bully air hammer is designed with a straight handle for easy, one-hand operation in close quarters or for blind-spot work. It also can be suspended from overhead reels for use on production lines.

This hammer, Model SP-2-900B, is 7¼ in. long, weighs 20 oz and uses 6.5 cfm of air. Metering trigger permits operator to control blows from 0 to 13,000 per minute. Slip chuck snaps 24 tools in or out easily, and the tools can be locked in eight different positions. Construction with only one moving part simplifies maintenance. — **Superior Pneumatic & Mfg. Inc.,** 4758 Warner Rd., Cleveland 25, Ohio.

For More Details Circle No. 409—Page 167

INSPECTION LIGHTS

Industrial inspection lights use handmade, miniature lamps designed for medical instruments to

produce a sharp, clear beam of light free from filament shadows and other aberrations. Very small shaft and lamp diameters permit their use in cavities which otherwise could not be inspected visually.

These lights are available with spot or diffused beam, with short or long extension shafts, and with or without rotatable mirrors, magnifying lenses, and directional caps. Individual lights can be interchanged instantly on a single handle, which serves as the power source. A rheostat on the handle varies light intensity.—**Welch Allyn Inc.,** Skaneateles Falls, N. Y.

For More Details Circle No. 410—Page 167

HEIGHT BLOCKS

Lightweight magnesium and aluminum height blocks speed tooling and patternmaking operations through easier handling. They are available in 5, 10, 15, and 20-in. heights, with tops 8 in. square.

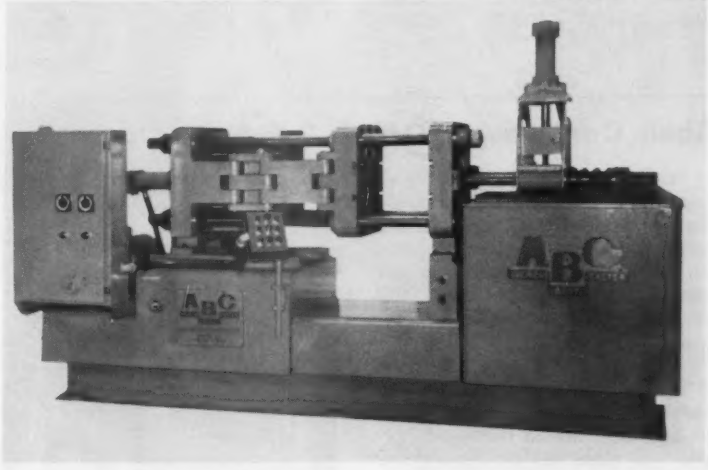
Hand-scraped faces accurate to within 0.0001 in. are available as standard. Serrated steel plates for top and bottom are available ground to within 0.0005 in. — **Challenge Machinery Co.,** Grand Haven, Mich.

For More Details Circle No. 411—Page 167

GRINDING WHEEL SALVAGE

Grinding wheel salvaging machine resizes silicon carbide, diamond, and all other types of grinding wheels. Manufacturer claims that the device resizes and if necessary re-establishes the wheel's bore in 15 to 20 minutes, depending on wheel size. It also can be employed to size new wheels to

Diecasting Machine Is Heavy Duty Unit



Model 5000 hydraulic, heavy duty zinc diecasting machine has capacity of 7-lb shot in zinc. Construction features include 150-ton locking pressure, 2½-in. tiebars, 24 x 24-in. steel platens, extra-large capacity melting furnace, manifold-mounted valves, and high cycling speed.

When it is employed with a cold chamber attachment, it can be converted for operation with aluminum. — **ABC Die Casting Machine Co.,** 400 E. 142nd St., Dolton, Ill.

For More Details Circle No. 442—Page 167

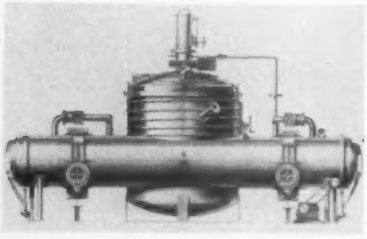
meet any specific requirements.

The machine can handle wheels from 8 to 42 in. in diam and up to 14 in. thick. It uses standard conical-type grinding wheel dressers, and cutting action is confined to crushing the wheel bonding. Drive is from a 7½-hp motor via V-belts. Spindle speed is variable from 125 to 500 rpm—**Machine Tool Div., Wickes Corp.**, 515 Washington, Saginaw, Mich.

For More Details Circle No. 412—Page 167

VACUUM MELTING FURNACE

Vacuum induction melting and casting furnace with four-chamber design features a mold tunnel for continuous direct casting of shapes or ingots under vacuum or inert gas atmosphere. It is made in capacities from 300 to 5000 lb of



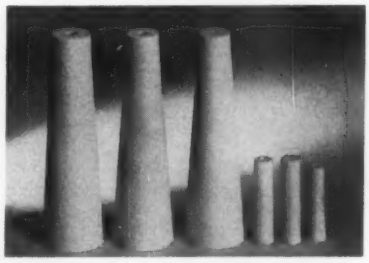
steel, or equivalent volumes of other metals.

The vacuum lock systems of these furnaces do not require breaking the vacuum in the main furnace chamber for the introduction or removal of molds. Among others, special modifications available include changes in melt capacity, changes in mold tunnel shape to accommodate molds or any size desired, and provision for inert gas flushing of all four chambers to the pressures required.—**Kinney Mfg. Div., New York Air Brake Co.**, 3529 Washington St., Boston 30, Mass.

For More Details Circle No. 413—Page 167

SANDBLAST NOZZLES

High-alumina, ceramic sandblast nozzles are made in three different styles and five orifice sizes. Nozzles



reportedly feature high strength and exceptional hardness to assure long service in handling abrasive streams. The nozzles are adaptable to a variety of diversified applications, including industrial cleaning and finishing.—Made by **Diamonite Products Mfg. Co.**, Canton 3, Ohio.

For More Details Circle No. 414—Page 167

LUMINAIRE HANGER

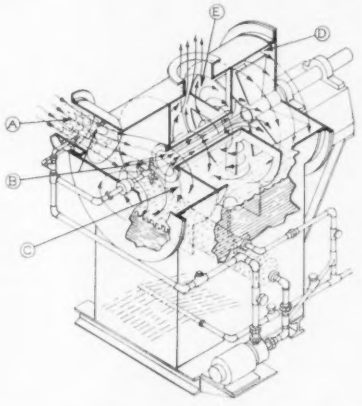
Disconnecting and lowering hanger is for use with high-bay fluorescent, mercury, and incandescent luminaires or clusters weighing from 60 to 120 lb. It features a multiple-fall pulley system with a 3-to-1 mechanical advantage for handline operation. One unskilled workman can lower, relamp, clean, and reposition heavy, high-bay lights within minutes.

Hangers are available with a variety of suspension assemblies to meet the requirements of diversified installations. They are Underwriters' rated and approved at 15 amp, 600 v; 30 amp, 250 v, alternating current; and 10 amp, 250 v, direct current. — **Thompson Electric Co.**, P.O. Box 873-AF, Cleveland 22, Ohio.

For More Details Circle No. 415—Page 167

HOT GAS WASHER

Single-unit hot gas washer is claimed to eliminate most air pollution problems and to resist temperatures up to 2000° F. Hot, dust-laden gases enter at the inlet connection (A), where gases are subjected to fine water sprays which cool them and wet the particles (B). Centrifugal force causes particles to impinge on the wetted surface of the primary separation chamber (C). From the primary chamber, gases flow into the induced draft



fan chamber (D), where particles impinge on the wetted surface. They flow down, are entrapped in water, and precipitate to the bottom of the settling tank. Water then is separated from the clean gases in what functions as a water eliminator chamber (E).—**Lehigh Fan & Blower Div., Fuller Co.**, Catasauqua, Pa.

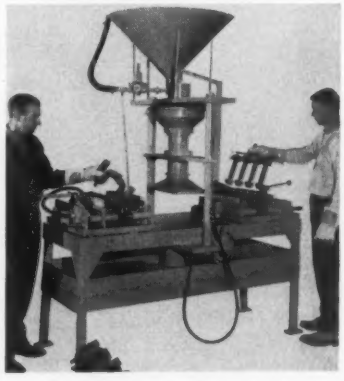
For More Details Circle No. 416—Page 167

Shell Coreblower Offers 2-Station Operation

Shell coreblower for the small foundry is a manually operated, 2-station shuttle-type machine built to make a variety of cores on each end. Each station accommodates coreboxes up to 4⅛ in. deep, 10 in. wide, and 15 in. long. Coated sand capacity is 200 lb.

The unit requires only two valves. One raises the left table to seal the box to the sand carrier and close the self-feeder; the other operates the blow head, giving the operator complete control over the blow time required for each type of job.

Each station has rollover action and is center pivoted. Heater vises are opened and closed by lever-and-cam action, assuring



positive seal of boxes during curing. — **Harrison Machine Co.**, Wesleyville, Erie, Pa.

For More Details Circle No. 443—Page 167

CENTRALIZED LUBRICATION

Miniature Accumite lubrication systems are for use on machinery with numerous bearings and limited installation space. Heart of the

FOR QUALITY THAT STANDS CLOSE INSPECTION

This Rockford Planer, like all Pyle equipment, is capable of virtually any patternmaking requirements for high-production type castings. Operated by craftsmen averaging 16 years of experience, the wide range of integrated equipment at Pyle guarantees top quality work, finished and shipped as scheduled.

. . . we suggest you look to Pyle! Our business has been built serving customers who accept nothing less than perfection.

Here every wooden model is prepared in flawless detail by men averaging 19 years of patternmaking experience. Our integrated foundry is designed, equipped and operated exclusively for pattern production. We have the lathes, radial drills, milling machines, planers and hydraulic or automatic duplicators to meet your every need. Meticulous hand finishing and uncompromising inspection guarantee your complete satisfaction.

For fifty years we've made patterns for America's most quality-conscious firms. May we have the pleasure of making them for you?

PYLE

PATTERN AND MANUFACTURING COMPANY

Muskegon Heights, Michigan

Circle 631 on Page 51

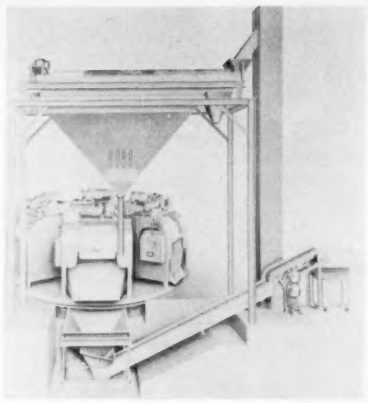
system is a miniature metering valve, slightly larger than a lubrication fitting, which services each bearing individually. It delivers a specified amount of lubricant to each bearing in the system, regardless of bearing clearance or distance from the pump. Lubricant does not drain from the system when the machine is idle.

Accumite systems can be actuated fully automatically by a power-driven pump; automatically controlled by a timeclock-solenoid mechanism; semiautomatically by a power-driven pump controlled by a manual push-pull valve; or by hand-operated pump. — **Alemite Div., Stewart-Warner Corp.**, Chicago 14, Ill.

For More Details Circle No. 417—Page 167

BARREL FINISHING SYSTEM

Automatic 6-station barrel finishing system is mounted on a turntable and equipped with a "memory" device. It automatically rotates completed work to a single operator station for unloading and reloading. One man can handle six barrel finishing machines efficiently —or 12 where systems are combined.

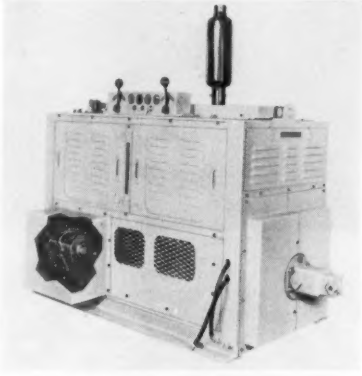


As the operator loads each barrel, he sets its timer for a prescribed processing cycle. The time cycle records on the turntable "memory" device, which automatically signals the timed-out barrel and rotates it to the operator's station on completion of the work.— **Almco, Queen Products Inc.**, Albert Lea, Minn.

For More Details Circle No. 418—Page 167

POWER PACKAGE

Complete "power package" is designed specifically for the company's RD series of diesel-electric units. It generates electric power for truck movement and also produces hydraulic power without the need for intermediate electric motors. Units so equipped operate at constant speed from no load to full load, assuring maximum economy for large trucks from 30,000 to 200,000-lb capacities.



Truck tractive power is supplied on demand by a special generator with separate excitation which produces only the energy required for the job. The operator has full con-

SPENCER VACUUM SYSTEM

handles both { CONVEYING and CLEANING ... at this Metals Plant

Pneumatic Conveying of lead, zinc and copper dust here is quick, dust-free and economical. Heavy material which settles out in breeching connecting the smelter to the Cottrell drops into hoppers. Once a day these hoppers are emptied by opening a slide gate valve. The accumulated heavy dust drops into a 6" Spencer vacuum line and is whisked back to the smelter.

General Plant Cleaning, carried on whenever system is not being used for conveying, is done with standard 1¾" and 2" Spencer hose and tool equipment. This bonus use of vacuum assures positive, dust-free sanitation.

Whatever **your** need in vacuum systems . . . for pneumatic conveying, cleaning, or **both** . . . it will pay to check with SPENCER —leader in developing systems to meet **individual** needs.

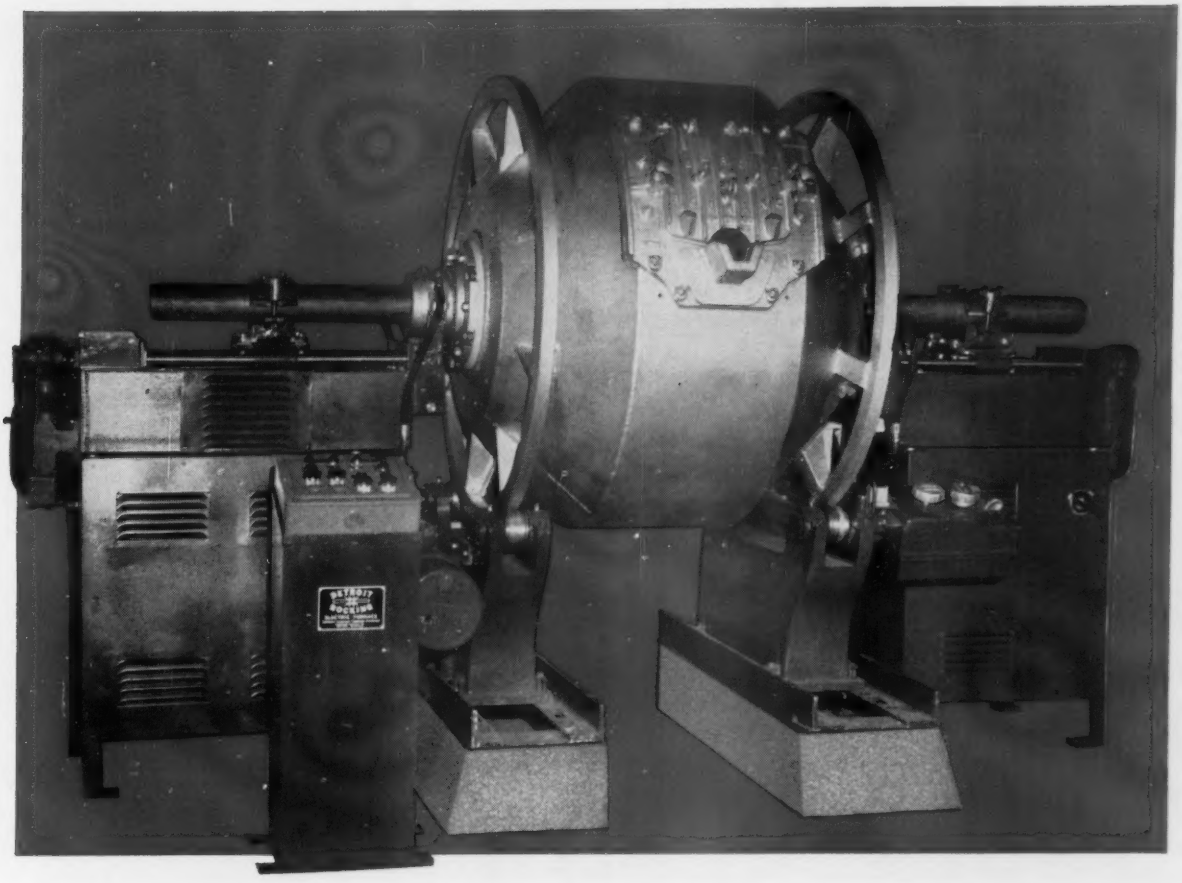
INSTALLATION DATA

Vacuum Producer: 60 H.P. Spencer.
Conveying Capacity: 7½ Tons per hour.
Primary Separator (1): 42" with 8" motor-driven rotary discharge valve.
Secondary Separators (2): 50" bag type with motor-driven bag shakers, automatic sequence timers and solenoid-operated valves.

Request these informative Bulletins:
No. 143-B Spencer Pneumatic Conveying
No. 155-B Spencer Vacuum

PORTABLE VACUUM CLEANERS — BLOWERS

The SPENCER TURBINE COMPANY
HARTFORD 6, CONNECTICUT



Get Greater Melting Efficiency With Detroit ROCKING Electric Furnaces

NEW ARC CONTROL SYSTEM AND MOTORIZED ELECTRODES ASSURE MAXIMUM HEAT UTILIZATION, AUTOMATIC ELECTRODE POSITIONING

The new "P" Series Detroit Rocking Electric Furnaces feature a simplified arc control system combined with motor-driven, pedestal-mounted electrodes.

The indirect arc is automatically controlled by a magnetic amplifier which adjusts motor speed in direct proportion to arc unbalance. This instantaneous action provides maximum heat per power input. There are no moving parts, relays or contactors to break or wear out.

Standard graphite electrodes are independently mounted on pedestals and motor driven. A ⅛ h.p. D.C. motor drives the automatic control. Direct-connected ⅓ h.p. A.C. motors on each electrode permit manual push-button control at greater speeds than possible by hand. This speeds electrode positioning for charging and shell change.

For full details on the new "P" Series indirect arc Detroit Furnaces, write for Bulletin 5610.

Ratings for furnaces with pedestal-mounted electrodes, motor controlled

Furnace Type	KW Rating	Nominal Cold Charge	Minimum Molten Metal
LFCP	125	350	500
LFNP	150	500	750
LFYP	175	700	1250
AAP	250	1500	3000
AAP	400	1500	3000
CMP	400	4000	8000
CMP	600	4000	8000

DETROIT ROCKING ELECTRIC FURNACES

Detroit Electric Furnace Division, Kuhlman Electric Company • Bay City, Michigan

MEMBER FEMA

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Elsa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castelvi Inc., 150 Broadway, New York 7, N.Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D.F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

You get the foundry alloy you need "Off-the-Shelf"

at your WHITEHEAD FOUNDRY ALLOY "Supermarket"

Over 99 different foundry alloys to choose from

Virtually all the foundry alloys you could possibly use are yours "off-the-shelf" from your nearest Whitehead warehouse. You can get handfuls to carloads in the standard sizes and forms you prefer. You'll find the price is right, too!!

These foundry alloys are all the finest quality from such leaders in the industry as The International Nickel Co., Vanadium Corporation of America, and Shieldalloy Corporation.

So why not check your supply of foundry alloys? If your stocks are low, get what you need, off-the-shelf, at Whitehead.

WHITEHEAD
METAL PRODUCTS COMPANY, INC.

303 West 10th Street • New York 14, N. Y.

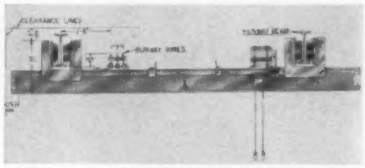
Other Offices and Warehouses: PHILADELPHIA • BUFFALO • HARRISON, N. J. • CAMBRIDGE, MASS. SYRACUSE • BALTIMORE • ROCHESTER • WINDSOR, CONN.

trol of vehicle speed through a control lever which regulates voltage from zero to full operation. Only forward and reverse contactors are required.—**Ready-Power Co.**, 3826 Grand River Ave., Detroit 8, Mich.

For More Details Circle No. 419—Page 167

MOTOR-DRIVEN CRANE

Low-cost motor-driven crane has machined wheels, each fitted with prelubricated precision ball bearings. All gears have cut spur teeth,



and the motor will drive the crane at 60 fpm. Bridge beams are standard I-beam sections.

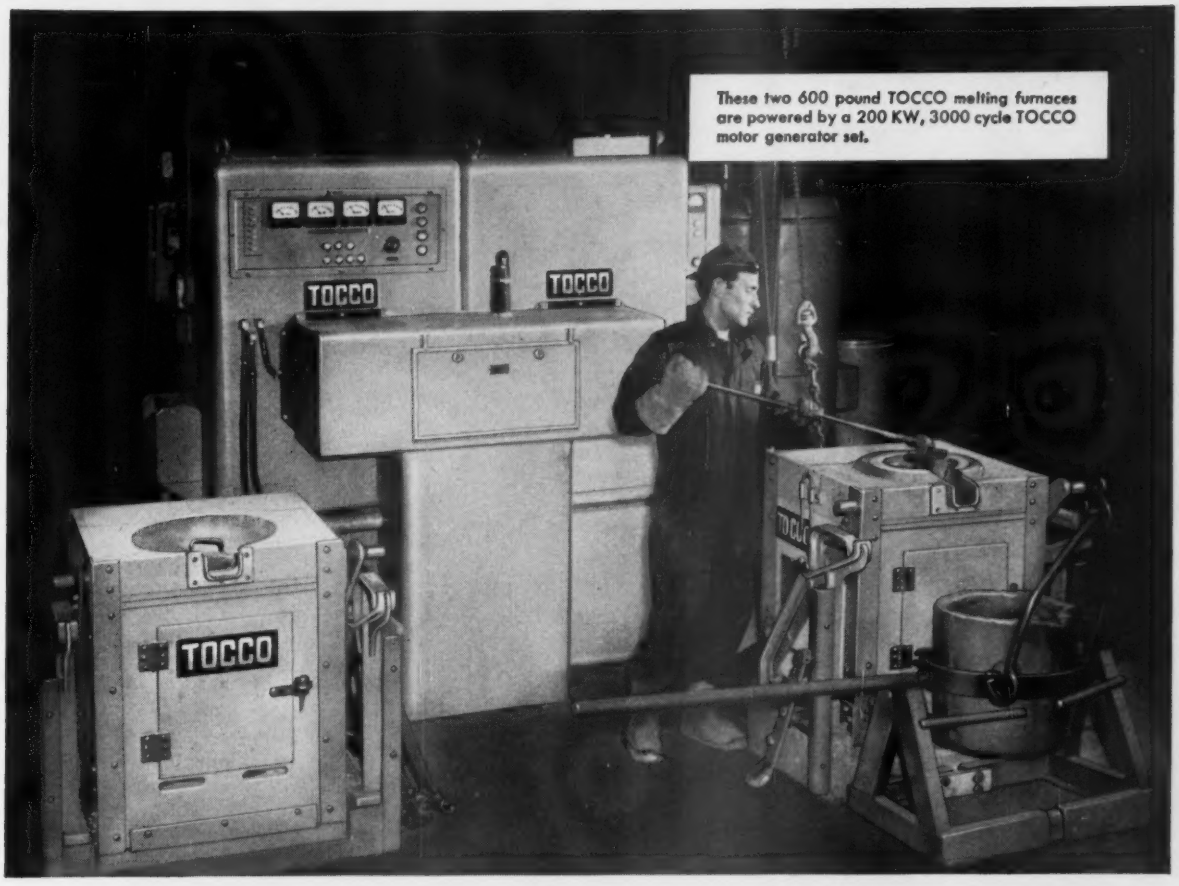
The standard unit is furnished with rope control, but magnetic, pushbutton control; runway collectors; and bracket and bridge conductor are optionally available. These cranes are made in 1, 2, and 3-ton capacity with up to 30 ft span.—**Bacon Crane & Hoist Co.**, c/o Fredericks & Co., 30 E. 39th St., New York 16, N. Y.

For More Details Circle No. 420—Page 167

LABORATORY FURNACE

Super-Temp furnace is a laboratory tool designed to operate at temperatures up to 4500° F for short-

time experimental work. Unit is self-contained, consisting of the furnace and the power supply with all controls mounted in a steel cabinet ready to be connected to the power supply. A temperature in excess of



These two 600 pound TOCCO melting furnaces are powered by a 200 KW, 3000 cycle TOCCO motor generator set.

TOCCO* Induction Melting "Delivers"— In Two Days Instead of Two Months!

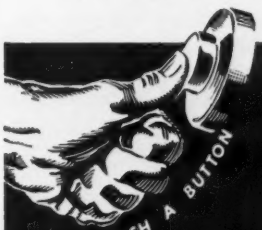
Casting backlogs at Commercial Shearing and Stamping Co. in Youngstown, Ohio used to lag from 8 to 10 weeks behind production schedules. By installing four 300 pound TOCCO melting furnaces this firm upped daily melting capacity to 16,000 pounds. Now orders can be shipped in 48 to 72 hours.

In a foundry occupying less than 5000 square feet of space, production of castings jumped between 40% and 50%; tensile strength of alloy castings was boosted from 35,000 to 50,000 p.s.i. Substantial savings in the cost of castings have resulted. Moreover, with precision casting and molding on a push button basis, many former drilling and roughing operations were completely eliminated.

Many firms have discovered that TOCCO Induction Melting insures maximum quality control, increased volume and lower operating costs.

Look to TOCCO also for *vacuum* melting furnaces of up to *5,000 pounds* capacity.

THE OHIO CRANKSHAFT COMPANY



TOCCO

*Trade Mark Reg. U. S. Pat. Off.

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. F-3, Cleveland 5, Ohio

Please send copy of "The Case for TOCCO Induction Melting."

Name_____

Position_____

Company_____

Address_____

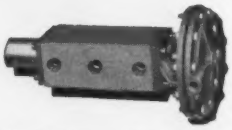
City_____ Zone____ State_____

Circle 635 on Page 51

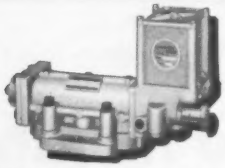
Can **YOU** afford
to overlook the lower costs
increased efficiency and dependability
other plants are getting with

Quick-As-Wink®
AIR AND HYDRAULIC
Control Valves

8" Double Pilot Operated 2-way Valve for Plant Water Systems; Pressures to 250 psi.



½" Diaphragm Operated Single Plunger 4-way Air or Hydraulic Valve; Pressures to 250 psi.



½" Single Solenoid 4-way Air Valve; Pressures to 125 psi; (Conforms to "JIC" Standards).

1" Hand Operated 4-way Hydraulic Valve for Oil or Water Service; Pressures to 2,000 psi.

Quick-As-Wink Control Valves are precision instruments:—unsurpassed for controlling all single or sequence machine movements. They are designed better — and made better — to give users unsurpassed efficiency, economy and satisfaction — free from breakdowns. Serviced easily and quickly — in the field — without disturbing any piping. No need to carry large stand-by inventories — or to return valves to the factory for servicing. Hundreds of different types, sizes and actions, including "JIC" designs. Sizes from ¼" to 4". You'll never know how good they are until you try them . . . *Get full details.*

Write for **BULLETIN NO. 571** *Today.*

Quick-As-Wink®
AIR AND HYDRAULIC
Control Valves

Mfd. by **C. B. HUNT & SON, INC.,** *1976 East Pershing St., Salem, Ohio*
— Engineering and Sales Representatives in the Principal Cities —

Circle 636 on Page 51

4000° F reportedly can be reached in about 60 to 90 minutes. It can be operated on any 220-v, single-phase, 100-amp power supply, and will draw 13.4 kw.—Made by **Harry W. Dietert Co.**, 9330 Roselawn Ave., Detroit 4, Mich.

For More Details Circle No. 421—Page 167

DRUM HANDLER

Device called Grizzly Roto-Tilt lifts, tilts, and rotates all kinds of open and closed drums, barrels, and similar containers. Rated at 1000-lb capacity, it is operated by one man and can be used with a fork truck, chain falls, cranes, and hoists.

Three models are offered—No. 250 for 55-gal drums, No. 251 for 30-gal drums, and No. 252 for 15-

gal drums. Special models can be engineered for particular requirements.—**Pucel Enterprises Inc.**, 3746 Kelley Ave., Cleveland 14, Ohio.

For More Details Circle No. 422—Page 167

PATTERN COATING

Krylon Crystal-Clear acrylic spray is said to simplify maintenance of smooth surfaces on wooden patterns, thereby promoting easy draws from sand molds. Periodic spraying is said to increase pattern life, produce a more resilient pattern surface, and to make the pattern finish impervious to the action of oils and other substances in foundry sand. As a result, mold patching and slicking are eliminated.—**Krylon Inc.**, 18 W. Airy St., Norristown, Pa.

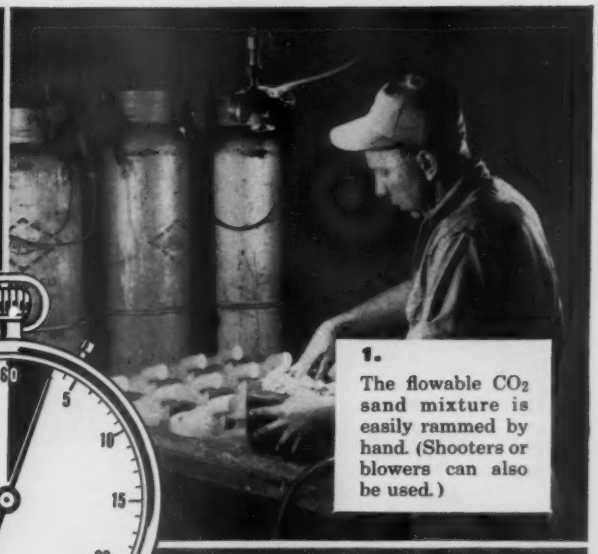
For More Details Circle No. 423—Page 167

SPRAY GUNS

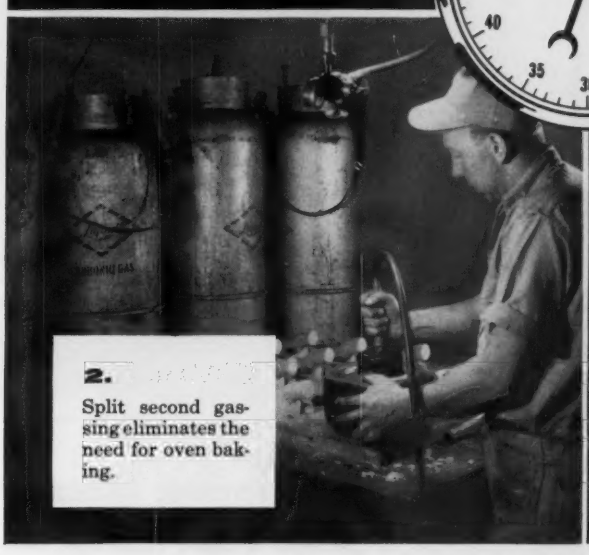
Two inexpensive, lightweight spray guns spray all types of paints and fast-drying lacquers. They are used with air compressors rated up to 1 hp. Both models allow the use of an external mix nozzle set up so that fast-drying materials

COMPLETE CORE IN 3 MINUTES

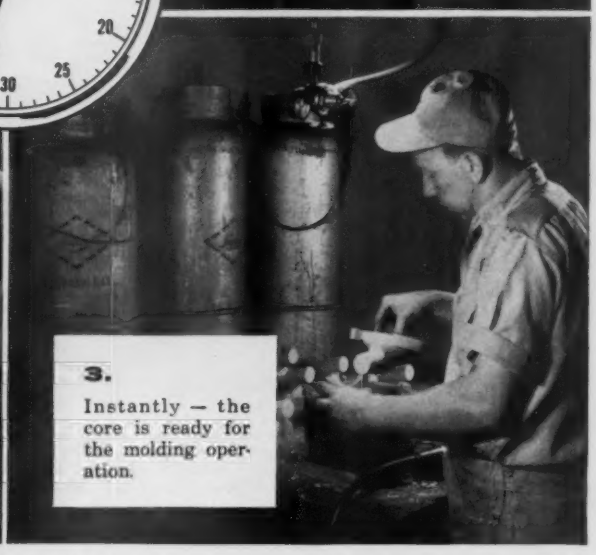
Rammed, Gassed and Removed!



1. The flowable CO_2 sand mixture is easily rammed by hand. (Shooters or blowers can also be used.)



2. Split second gassing eliminates the need for oven baking.



3. Instantly — the core is ready for the molding operation.

The CO_2 process proves to be a fast and economical method for core production at the J. M. Bruce Foundry in Cedar Grove, Wisconsin.

CO_2 PROCESS INCREASES CASTING CAPACITY . . . CUTS EQUIPMENT COSTS . . . ELIMINATES CORE STORAGE!

Glen and Mark Bruce, who operate the 40 year-old J. M. Bruce Foundry Co., are enthusiastic about the use of CO_2. An actual cash savings of thousands of dollars is reported due to the decrease in baking equipment and core storage. Valuable floor space previously used for core storage is now allocated to actual production use.

For J. M. Bruce Foundry Co. the big advantages in CO_2 are the increased size of the castings they can pour (without buying special core equipment)—50% reductions in core costs . . . virtual elimination of "plows". . . no danger of drops, soft or wet spots . . . reduced core handling, extreme speed and flexibility in supplying core needs, and *making cores only when they need 'em.*

Get the facts on CO_2 core and mold making—complete information sent upon request.

World's Largest Producer of

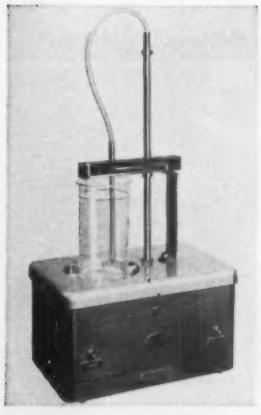
LIQUID CARBONIC

DIVISION OF GENERAL DYNAMICS CORPORATION

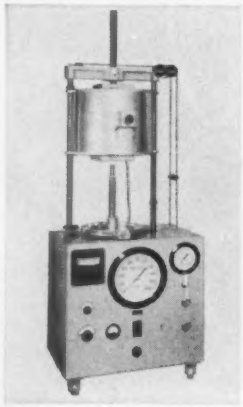
3150 South Kedzie Ave., Chicago 23, Illinois

ENJOY THE BETTER THINGS OF LIFE

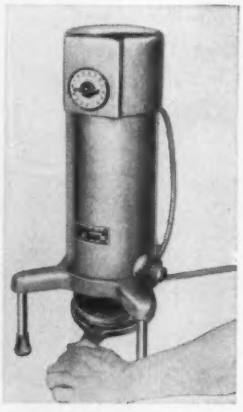
Why overwork yourself? Dietert-Detroit Sand Control Units can help you PRODUCE *BETTER CASTINGS* AT *LOWER COSTS* IN *LESS TIME*.



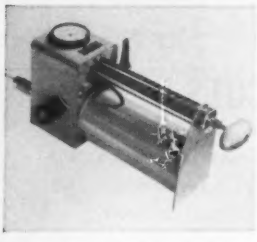
AUTOCLAY . . . No. 513
Saves operator's time in running A.F.S. clay substance test. Better castings and easier molding result from sands with controlled clay content.
To obtain better casting finish, improve sand grain distribution, control fineness.



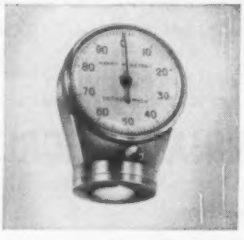
THERMOLAB . . . No. 785
For clean castings, free of defects. Test and control the high temperature properties of your molding materials with the Dietert-Detroit Thermolab. Reduce or eliminate scabs, cuts, etc.



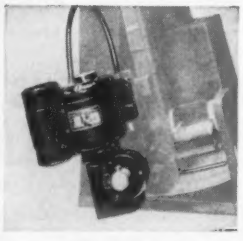
MOISTURE TELLER . . . No. 276
Control moisture content in your molding sands and you will control the greatest variable causing defects in any foundry. The No. 276 takes but a few minutes to check moisture content.



RAGONE . . . No. 4210
Measure fluidity of ferrous and nonferrous metals in seconds. Take the guess-work out of pouring requirements—know when your metal will flow properly to fill the mold.



MOLD HARDNESS TESTER . . . No. 473
Molds too soft? Rough surface can result. Molds rammed too hard? You may get rat-tailed or buckled castings. Be sure your molds are properly rammed, use the No. 473 Hardness Tester.



MOTOR DRIVE . . . No. 401
Eliminate the human variable of hand loading . . . equip your hand-operated sand strength machine with a No. 401 Motor Drive.

DIETERT DETROIT
HARRY W. DIETERT CO.
9330 Roselawn
Detroit 4 Michigan

HARRY W. DIETERT COMPANY
Gentlemen: Rush me data on the following:

☐ Autoclay No. 513
☐ Thermolab No. 785
☐ Moisture Teller No. 276
☐ Ragone No. 4210
☐ Mold Hardness Tester No. 473
☐ Motor Drive No. 401

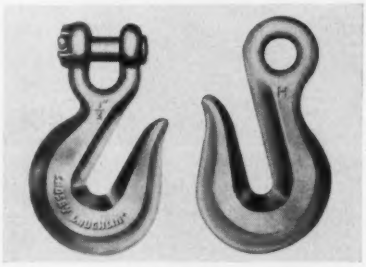
Name_____
Company_____
Address_____
City_____ State_____

may be sprayed without nozzle buildup. Model 35 is equipped with a 1-qt siphon cup and is a bleeder type without air valve. Model 36 is best adapted for use with a fluid pressure tank and is a nonbleeder type.—**Binks Mfg. Co.**, 3122 Carroll Ave., Chicago 12, Ill.

For More Details Circle No. 424—Page 167

GRAB HOOKS

Drop forged grab hooks are said to reduce chain kinking, fit the chain better, reduce side move-

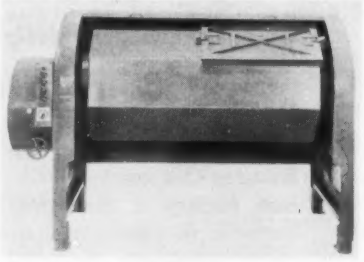


ments, and hang straight. They are available in three types of material to provide a range of capacities. Standard chain industry color coding is used to identify the proper hook for each type of chain. Positive identification of material as well as of rated capacity is stamped on each hook.—**Crosby-Laughlin Div., American Hoist & Derrick Co.**, P.O. Box 570, Fort Wayne, Ind.

For More Details Circle No. 425—Page 167

BARREL FINISHING MACHINES

No. 30 series of barrel finishing machines includes 15 models with capacities from 5 to 25 cu ft. They



feature streamlined design, smooth operation, and a cylinder sealing method said to insure leakproof operation under all conditions.

An oversized, variable speed V-belt system and other construction features reduce shock and vibration. Pushbutton controls with positive safety jogging permit the operator to inch the cylinder forward or reverse during loading or unloading. The front closure extends well be-

ELPAR ELECTRIC TRUCKS...

Save $1,200 Per Truck Per Year

Cost surveys made at a number of plants reveal that ELPAR electric trucks cost one-third less to operate and maintain than comparable gas models. Based on 2,000 hours of operation, this means an average saving of more than $1,200 per truck per year.

In addition, ELPAR electrics give twice as many years of dependable service as gas trucks operating under similar conditions. Thus, when *all* initial and replacement costs are added up, ELPAR electric trucks actually cost *less* to buy.

And, the surveys show that average downtime for ELPAR electrics is 2 to 3% while that for gas trucks is 10 to 15%.

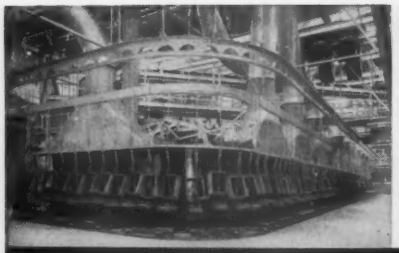
More and more companies are converting their fleets to dependable, fume-free ELPAR trucks. Join the trend. Choose from our complete line of fork and ram trucks, low lift and high lift platform trucks, and mobile cranes—and save on *first* cost and *operating* cost. Get all the facts. . .

WRITE FOR YOUR COPIES
of the ELPAR *Lift,* "Gas vs. Electric Trucks" and "LP-Gas vs. Electric Trucks."

ELPAR®
ELECTRIC TRUCKS

THE ELWELL-PARKER ELECTRIC COMPANY
4313 St. Clair Avenue • Cleveland 3, Ohio

Twice the Life . . . 1/3rd the Operating Costs



View in new Southern Foundry, shows pouring station with K & B system which removes smoke and fumes as they are formed.

"Shakeouts" in the foundry of a noted implement firm equipped with K & B Dust Control System.

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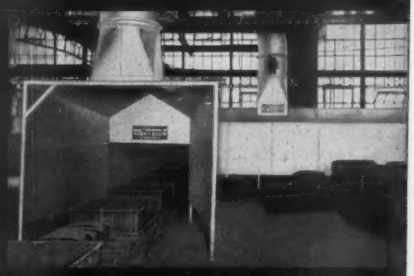
2. FABRICATION
3. INSTALLATION

For all three . . . call K & B



K & B Plenum Chamber Hood for mold conveyor operation. Note bolted section construction for ease of maintenance.

For 50 years, Kirk & Blum has specialized in the DESIGN, FABRICATION and INSTALLATION of efficient, dependable systems for the removal of dust and fumes.

DESIGN: Kirk & Blum engineering specialists survey your plant and then design your system, selecting equipment most suitable for your problem.

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DUST AND FUME CONTROL SYSTEMS

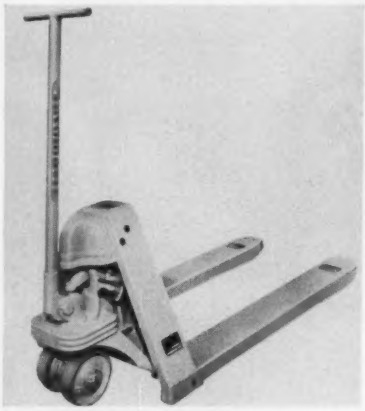
The Kirk & Blum Mfg. Company, 3239 Forrer Street, Cincinnati 9, Ohio

low the cylinder, and the machine stops when the closure is raised. All models have full-opening doors without ledges.—**Crandall Engineering & Mfg. Inc.**, Vicksburg, Mich.

For More Details Circle No. 426—Page 167

LOW-LIFT HAND TRUCKS

New line of low-lift hand trucks includes six models in both mechanical and hydraulic lift types. Capable of handling skid platforms and pallets, they are available in



various sizes and types. Capacities range from 1000 lb in the mechanical lift to 10,000 lb in the heavy duty, multiple-stroke hydraulic lift. Model AH is shown here. Typical of the platform-type hydraulic lift trucks, it is available in 4000 to 10,000-lb capacities. —**Automatic Transportation Co.**, a division of **Yale & Towne Mfg. Co.**, 149 W. 87th St., Chicago 20, Ill.

For More Details Circle No. 427—Page 167

SHELL MOLDING RESIN

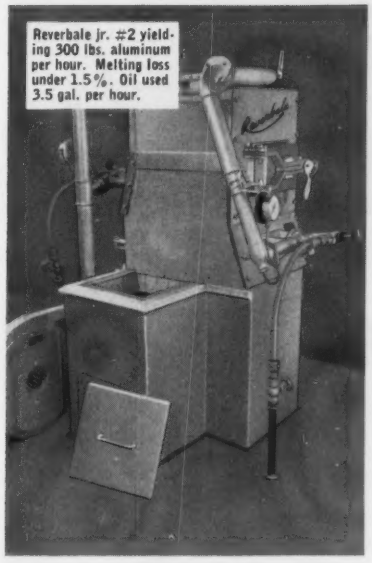
Powdered shell molding resin labeled S4343 is described as an improved version of the company's MCF-7 resin. It is said to be superior in regard to odor, mold release, and rigidity.—**Borden Chemical Co., Resins & Chemicals Dept.**, Bainbridge, N. Y.

For More Details Circle No. 428—Page 167

SETTLING TANK

Design of the Uniflow settling tank for removal of solids from water and industrial wastes is reported to provide these advantages: Uniform influent distribution across the tank; uniform flow throughout the entire tank length; and uniform effluent discharge from the surface.

The tank combines a rapidly sloping bottom with multiple effluent weirs. This design is said to in-



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Circle 641 on Page 51

crease efficiency of solids removal, permit economical construction, and maintain the velocity of liquid throughout the tank at as nearly uniform a rate as practical tank construction allows.—**Link-Belt Co.**, Prudential Plaza, Chicago 1, Ill.

For More Details Circle No. 429—Page 167

WEAR RESISTANT PARTS

Line of wear resistant parts is made of wear-resistant steel of BR-4 analysis. Immediately available are plow and pug mill tips for use in mixers and pug mills. In one application, the parts are attached to standard plows as throwaway inserts. Tests are said to indicate performance life 4 to 10 times that of standard similar parts. The BR-4 steel also is available in cast form for special applications. — **Latrobe Steel Co.**, Latrobe, Pa.

For More Details Circle No. 430—Page 167

DETACHABLE BOOM

A detachable boom now is available on the company's line of Huskie (3000 to 4000 lb drawbar pull) and Super-Huskie (4000 to 5000-lb drawbar pull) gasoline or LP gas tractors. It operates in conjunction with a winch, is fabricated of

channel and bar stock, and can be mounted or removed in minutes.

The winch power takeoff is connected directly to the transmission. Capacity is 7000 lb, and it can be used with or without the boom, thereby extending its versatility.—**Mercury Mfg. Co.**, 4700 W. Division St., Chicago 51, Ill.

For More Details Circle No. 431—Page 167

TESTING MACHINE

Air-operated stress rupture and creep testing machine reportedly assures convenient, uniform load application for indefinite periods. Infinitely variable loads to 30,000 lb are applied without shock and maintained regardless of normal fluctuations in line pressure. Load is indicated by either of two mercury column indicators—low range

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IRONTON BERLITE STANDS MORE HEAT *than any fire clay brick you'll ever use!*

In the tap hole area of a malleable iron furnace with metal tapped at 2840° F, *IRONTON* BERLITE mortar is ***more refractory than super-duty brick.*** When the furnace was shut down for repairs after running 16 hour heats, pouring 400 tons a day for weeks, we took the photograph above. The joints of *IRONTON* BERLITE stand out like a backbone along the brick sidewall.

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IRONTON BERLITE will outlast any fire clay material. For an actual photograph and service report on BERLITE in a really hot installation, write to our Special Products Division.

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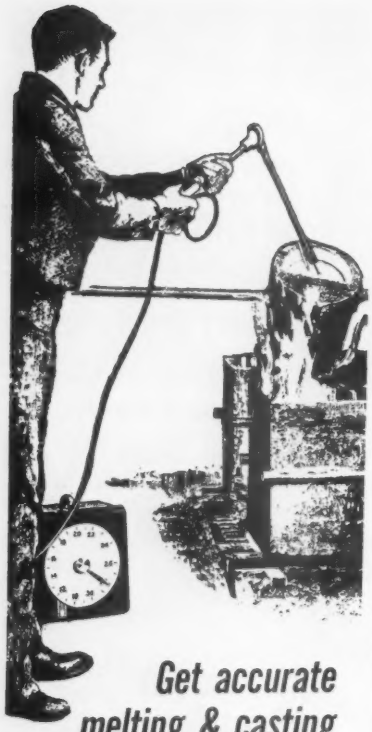
Circle 642 on Page 51



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Now, in 10 seconds or less, you can get precise molten metal temperature measurements in induction furnaces, pot furnaces, ladles, risers, test spoons, runner boxes, troughs, lab furnaces . . . anywhere in the shop.

The operator simply dips the platinum tip of the L&N Portable Thermocouple—protected by its expendable, low-cost quartz sheath — into the molten metal. In seconds, he sees true temperature boldly indicated on the 23-inch circular scale of the portable, a-c operated Speedomax H potentiometer indicator.

Simple to use, economical to maintain, this equipment has been enthusiastically received in hundreds of foundries and melt shops. It's available as a complete "package"—with an indicator range of 1000 to 3000 F, or 2000 to 3200 F, as specified—ready for immediate use.

A call to your nearby L&N Field Office will bring full information . . . or write for Data Sheet N-33A-681(3) to Leeds & Northrup Company, 4917 Stenton Avenue, Philadelphia 44, Pa.

LEEDS & NORTHRUP
Instruments Automatic Controls Furnaces

Circle 643 on Page 51

of 0 to 6000 lb and high range of 0 to 30,000 lb. Specimen may be tested at any temperature from 0 to 1800 or 2000° F. Temperature is maintained automatically by an electrically operated furnace. The unit is available with a variety of extensometers.—**Tinius Olsen Testing Machine Co.**, 7458 Easton Rd., Willow Grove, Pa.

For More Details Circle No. 432—Page 167

BARREL AND BOX GRAB

Barrel and box grab is made to pick up without damage any type of wood or steel barrel, box, or container from small-nail-keg size to 40 in. in diam. It is available in two standard sizes, ½ and 1 ton, and the manufacturer also builds grabs to accommodate larger, heavier loads for special requirements. Each grab is designed on the toggle principle so that the heavier the load, the more rigidly it is held.—**Palmer-Shile Co.**, 16033 Fullerton, Detroit 27, Mich.

For More Details Circle No. 433—Page 167

FRICTION SAW BLADE

Fast, easy cutting and extremely long life are claimed for a new friction saw blade which features an efficient tooth and gullet design and is heat treated to anchor the teeth permanently and to preserve the set. Metallurgical characteristics assertedly permit maximum flexation of the band and result in long life and

great resistance to abrasion at high-friction sawing velocities. The blade is offered in ½, ¾, and 1-in. widths. —**DoAll Co.**, Des Plaines, Ill.

For More Details Circle No. 434—Page 167

DIE ALLOY

High-strength zinc-base alloy for metal forming dies is called Hi-Phy Kirksite and supplements Kirksite A, which was developed by the company in 1939. The new alloy will

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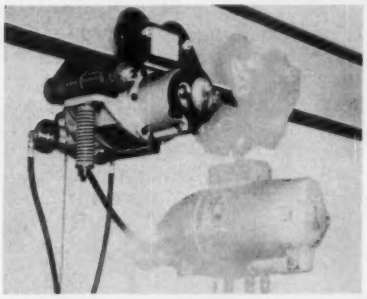
Circle 644 on Page 51

be offered as a premium tooling material which cuts die weights up to 20 per cent, yet provides longer life. It is said to possess 400 per cent greater impact strength than Kirksite A. Test results reportedly show that the new alloy has a consistently greater degree of hardness, substantially refined grain size, improved resistance to creep, more tensile strength, and improved compressive strength. Its fluidity, low melting point, low dross loss, and easy castability equal that of the older alloy.—**Morris P. Kirk & Son Inc.**, subsidiary of National Lead Co., 111 Broadway, New York 6, N. Y.

For More Details Circle No. 435—Page 167

POWERED HOIST TROLLEY

The Hoistractor is a powered hoist trolley which is said to enable one man to raise, lower, or move loads up to 2 tons with positive control. Powered by an axial-piston type air motor, the unit exerts 250-lb drawbar pull on a beam through a spring-loaded neoprene drive wheel. It will pull a 2-ton load at 70 fpm, and speed can be varied from a slow creep to full speed of 150 fpm. A single, one-hand control for hoist and tractor is available in two types, a pendent control and a swiveled rod with 4-way grip control.—**Gardner-Denver Co.**, Quincy, Ill.



For More Details Circle No. 436—Page 167

DRUM FAUCET

Drum faucet features a sturdy spring within its body to maintain a liquidtight closure at all times. Hand pressure on a lever type handle is necessary to push spring back and forth to permit flow of liquid. Valve closes automatically when hand pressure is released. Two types are available: A self positioning swivel type which may be screwed into the drum opening and the spout then swiveled to the correct angle for dispensing, and a rigid type faucet which generally requires

Ladle lining cost:
1.3 cents
per ton of metal handled

COSTS ARE WATCHED closely in the big automotive castings production foundries. Figures show that **CARO-LINE**, Ironton's special refractory for ladle linings, is doing a terrific job in a 3-ton transfer ladle handling gray iron at a large midwestern plant. Compare the facts:

A 4½" LINING of **CARO-LINE** lasts up to 21 operating days on a 16-hour schedule. The ladle is handling 200 to 250 tons of metal per day, or a maximum of 5250 tons before relining. The gray iron hits the ladle at 2750° to 2830° F.

THE LINING of Ironton **CARO-LINE** is costing $.013 to $.014 per ton of metal handled. That's reason enough to prefer **CARO-LINE**, but the superintendent notes two other advantages. (1) **CARO-LINE** chips out easily when it is time to reline. (2) **CARO-LINE**'s longer service life saves labor.

IN AN EMERGENCY, CARO-LINEd ladles can be put into service without preheating to a bright red. It's safe to skip the torching, because **CARO-LINE** dried in a core oven for 48 hours at 275° F. is ready for service. Normal practice calls for oven drying and preheating, time permitting.

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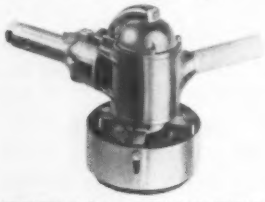

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A rugged tool for speedy production or general maintenance drilling. Effective lubrication system insures long trouble-free service. Equipped with self-centering ¾″ 3-jaw chuck.

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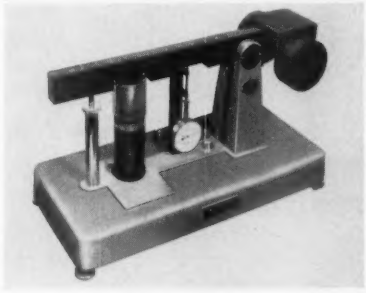
a thread compound to form a liquid-tight connection.—**Made by Protectoseal Co.**, 1920 South Western Ave., Chicago 8, Ill.

For More Details Circle No. 437—Page 167

CREEP DEFORMATION TESTER

No. 418 creep deformation tester measures the ability of green molding sand and core sands to main-

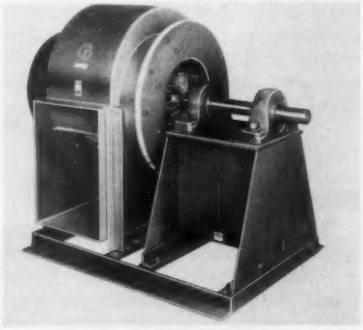


tain dimensional accuracy under static load. Creep deformation of molding sand is a measure of its tendency to permit mold-wall movement under metallostatic pressure. Low values indicate a rigid mold wall conducive to production of castings of precise dimensions. With core sands, the deformation test under static load aids in the selection of materials that will promote dimensionally accurate cores.—**Harry W. Dietert Co.**, 9330 Roselawn Ave., Detroit 4, Mich.

For More Details Circle No. 438—Page 167

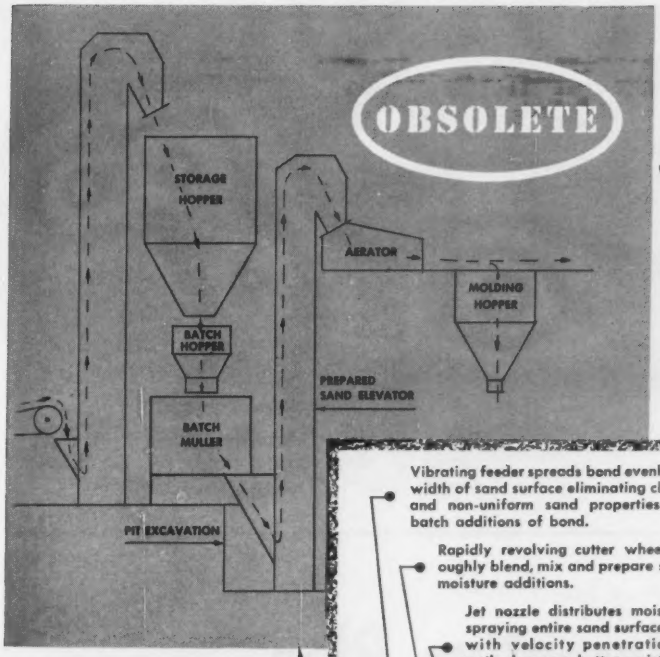
HEAT FANS

High-temperature heat fans are said to use a new principle to keep bearings in cooler operating zones.



A rotating member of a dissimilar alloy, fitted to the shaft, radiates and circulates ambient heat away from the bearing areas. The line ranges from 600 to 30,000 cfm and handles temperatures to 1650° F. —**General Blower Co.**, 8611 Ferris Ave., Dept. H, Morton Grove, Ill.

For More Details Circle No. 439—Page 167



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WHEN FOR

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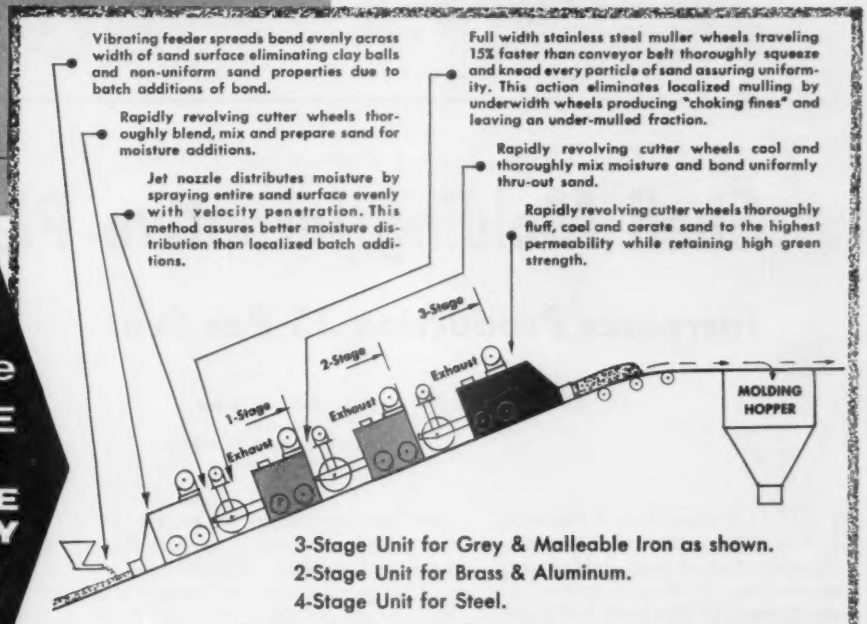
You can get

3 TIMES THE CAPACITY

with the simple and efficient Pekay Mixer Muller


Vibrating feeder spreads bond evenly across width of sand surface eliminating clay balls and non-uniform sand properties due to batch additions of bond.
Rapidly revolving cutter wheels thoroughly blend, mix and prepare sand for moisture additions.
Jet nozzle distributes moisture by spraying entire sand surface evenly with velocity penetration. This method assures better moisture distribution than localized batch additions.
Full width stainless steel muller wheels traveling 15% faster than conveyor belt thoroughly squeeze and knead every particle of sand assuring uniformity. This action eliminates localized mulling by underwidth wheels producing "choking fines" and leaving an under-mulled fraction.
Rapidly revolving cutter wheels cool and thoroughly mix moisture and bond uniformly thru-out sand.
Rapidly revolving cutter wheels thoroughly fluff, cool and aerate sand to the highest permeability while retaining high green strength.
3-Stage
2-Stage
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Exhaust
Exhaust
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MOLDING HOPPER

3-Stage Unit for Grey & Malleable Iron as shown.
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THE ADVANCE PEKAY MIXER MULLER FEATURES:

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- Separate mixing, mulling and aerating phases, a Pekay exclusive. Each phase is designed and engineered to properly perform its individual function.
- Lower inertia rotating parts that reduce horse power to less than ½ required by batch mixing.
- Accessible, wear-resistant parts reducing maintenance to absolute minimum.
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- No lost production due to mechanical breakdown another Pekay exclusive. Individual sectional drives overcome complete unit stoppage. Should breakdown occur in any part of machine, remaining sections continue to properly condition sand.
- Progressive cooling due to removal of heat by the Pekay exclusive "air-thru-sand-shower" process.
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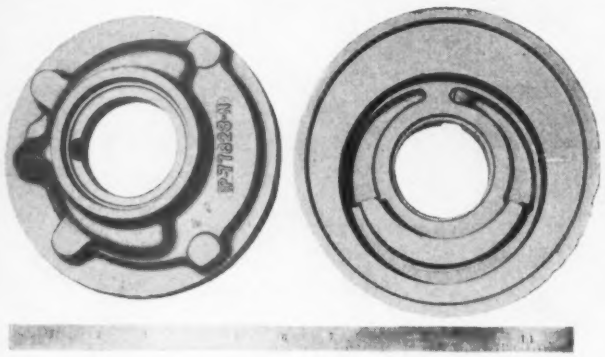


Fig. 1—Production of four-cavity molds for these castings rose from 278 to 370 a shift under the company's incentive plan

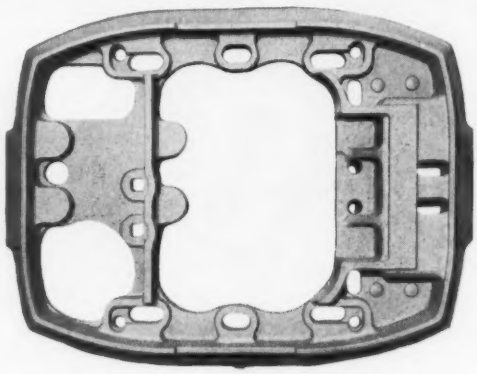


Fig. 2—The incentive system boosted rate of output on single-cavity molds for this base casting from 125 to 163 each shift

Shell Molding Incentive Plan

Increases Production 35 Per Cent

By EARL W. JAHN
President
Production Pattern & Foundry Co.
Chicopee, Mass.

A LITTLE more than a year ago, after five years of increasing production of shell molded gray iron castings, it became evident to management of Production Pattern & Foundry Co., Chicopee, Mass., that casting production was too low in view of the immense potentials of the shell molding process. The remedy decided on was a shell mold incentive system. The result was that casting production increased approximately 35 per cent.

The foundry operates three two-station shell molding machines and one single-station machine, in addition to a medium-sized, mechanized sand foundry for production of gray iron castings. Since an incentive system used in connection with the sand foundry mold operation was proving highly satisfactory, it seemed logical to our management to adapt the principles of that system to the shell molding operation.

Sand Weight the Basis — Sand foundry mold rates are based on flask size (which is equivalent to sand weight), and certain additions are made for other operations—setting cores, peening, and riddling. Thus the company based its new shell molding incentive system on the weight of sand and resin mixture used in shell production.

The question of how many shell molds can be produced per hour had to be answered. But in setting up a system fair to both the operators and the company, more than time study of each job had to be considered. The following factors which have definite bearing on production output of quality molds and subsequent good castings also had to be studied: 1. Machine capabilities. 2. Pattern design and construction. 3. Sand and resin. 4. Core setting. 5. Gluing or bonding methods. 6. Pouring methods. 7. Casting specifications.

These factors are not necessarily in order of importance, but each is essential in efficient shell molding. We knew that a clear understanding of each had to be established before we could launch a sound incentive program.

Shell molding is, of course, basically a matter of time and temperature. Depending on the shell thickness required to produce the casting needed, pattern heat (in relation to dwell time for investment thickness) and final cure time are predominant factors in determining cycle time. The company settled on a pattern temperature of about 450° F as giving the best results.

A study of over-all shell casting requirements based on horizontal pouring without backup material enabled the company to establish suitable shell thicknesses on each job.

Molds were weighed carefully to establish fixed mold weights. Several operations were run at these specified weights on the twin-station machine. As expected, the light mold production rate was much faster than that of heavier molds, but regardless of what weight mold was produced, sand and resin consumption per day or per hour was the same.

Thus the foundry arrived at a figure of 5000 lb as the amount of mixture a shell molder should process per 8-hour shift (based on 7½ productive hours per 8-hour shift). This amount was determined for a powdered resin and sand mixture under conditions in Production Pattern & Foundry Co. Coated sand, in particular, would require a dif-

Fig. 3—On this 15 x 20-in., 20-cavity mold, which requires the setting of ten cores, the production rate increased from 294 to 382 a shift

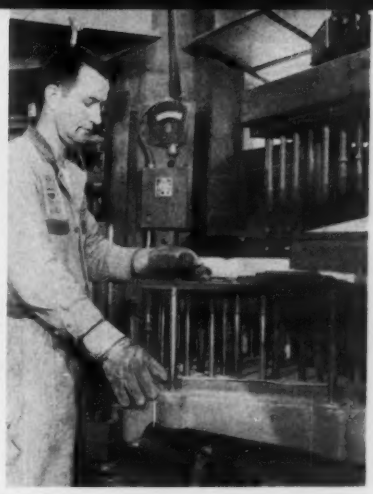


Fig. 4—The plan provides for a bonus for additional operations such as core setting

ferent standard production figure. In any event, individual foundries would have to determine their own standards.

This amount of 5000 lb divided by the weight of the individual shell shows the number of shells produced per shift, and the figure per shift divided by eight shows the shell number required per hour. Base rate of $1.90 per hour divided by the number of shells required per hour establishes labor value per shell. Note: A 6 per cent cost of living increase is added to comply with current pay rate of $2.014 per hour.

Extras Added to Base—As in the company's sand foundry, labor value is increased for additional work (such as placing cores), and base rate is guaranteed as a minimum. Each shell completed in excess of required production adds a bonus to the molder's wages. To compute this bonus, labor value of the mold standard per shift is subtracted from the labor value of actual molds produced, the difference representing the incentive or bonus pay.

Table I is based on production on double-station machines. These rates can not be used for single-station machine work, since a single-station machine is unable to process 5000 lb of sand-resin mixture in one shift. To compensate, wages for the single-station molder

TABLE I—Basis for Computing Incentive Pay

(Production standard is 5000 lb of sand mixture per shift)

Shell Mold Weight (lb)	Mold Standard Per Shift	Approximate Current Production	Labor Value Per Mold
10	500	650	$0.0304
11	455	591	0.0334
12	417	542	0.0365
13	385	500	0.0395
14	357	464	0.0426
15	333	433	0.0456
20	250	325	0.0608
25	200	260	0.0760
30	167	217	0.0910
35	143	186	0.1063
40	125	163	0.1216
45	111	144	0.1369
50	100	130	0.1520
55	91	118	0.1670
60	83	108	0.1831

Base rate equals $1.90 per hour (6 per cent cost of living increase, $0.114, to be added).

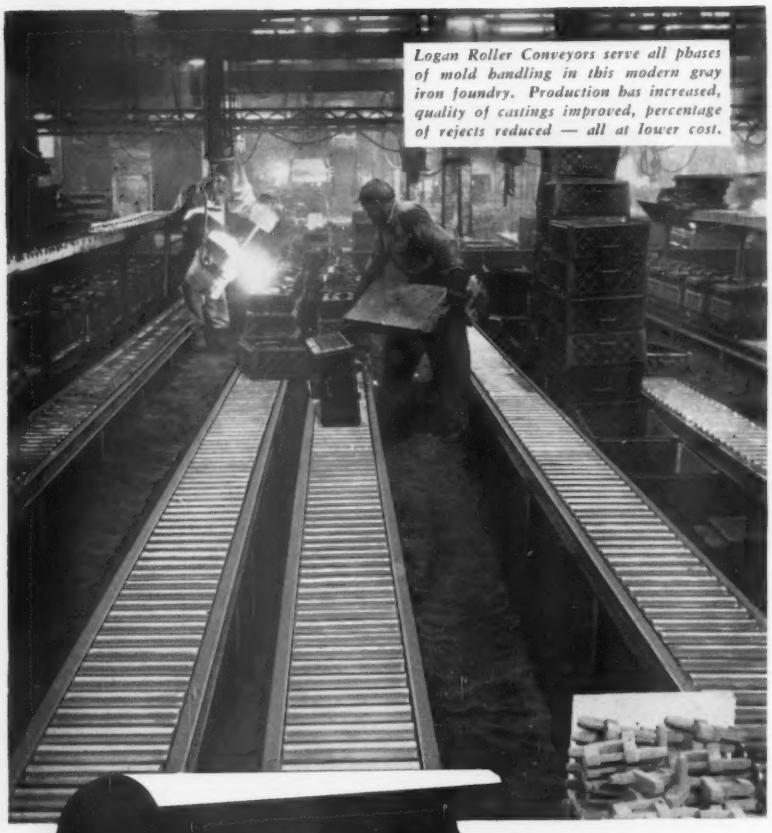
Premium for setting cores is $0.0010 per core for stock cores (small cores, such as pin cores); $0.0015 per core for body cores (medium-sized cores); $0.0020 per core for heavier cores (largest core set with one hand); $0.0025 per core for heavy cores (requires two hands to set).

This chart is based on 7½ productive hours per 8-hour shift.

TABLE II—Production Increases on Three Castings

Mold Weight, lb	Casting Weight, lb	Original Production per Shift	Current Production per Shift	Per Cent Increase
18	5.0	278	370	33
40	51.5	125	163	30
17	0.375	294	382	30

Fig. 5—Molds shown here were made on a two-station machine. Two of the small molds in the foreground can be produced in the same length of time as the single large mold in the rear


Logan Roller Conveyors serve all phases of mold handling in this modern gray iron foundry. Production has increased, quality of castings improved, percentage of rejects reduced — all at lower cost.

SALES begin in the SHOP!

Today, your "man in the field" needs every advantage that you can give him — particularly a favorable price. Cost studies show that the selling edge is often a *price edge* that begins on the production line. That's why management is turning more and more to materials handling in its quest for economy.

Soundly engineered Logan Conveyors have brought savings in time, effort and space to companies large and small for half a century. Perhaps Logan's experienced engineering personnel and time-tested equipment can provide that vital edge in the market place for you, too. Write for literature, or for nearest engineer to call.

LOGAN CO., 580 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

are figured at table value plus 100 per cent. Obviously there is danger here of overevaluation of single-station work.

Another provision for elimination of a rate discrepancy was devised to cover instances when double-station jobs require evaluation in different weight classes. Since curing time for a heavier shell slows down the complementary job, both operations are paid in the weight class of the heavier shell.

The benefits this plan offers both the molders and the company are shown clearly by case histories.

Case Histories Show Benefits

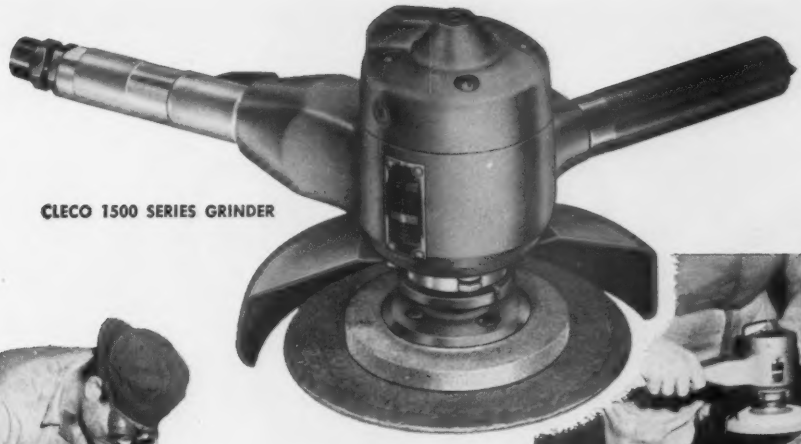
Table I represents par production for various mold weights, labor value per mold, and actual production since the incentive plan was initiated. Interesting here is the fact that two production jobs, to be described later, actually surpassed the chart figure for approximate current production of 6500 lb.

The casting illustrated in Fig. 1 is cast in a 15 x 20-in. shell mold containing four mold cavities. Mold weight is 18 lb, and pouring weight is 27 lb (four castings plus gates and risers). After cleaning, castings weigh 5 lb each. The original production rate was 278 molds per shift. Currently, the production rate averages 370 molds per shift, an increase of 33 per cent.

A large base casting is shown in Fig. 2. This casting is made in a 20 x 30-in., single-cavity shell mold weighing 40 lb. The gated casting weight is 61 lb, and shipping weight is 51.5 lb. Present production rate is 163 molds per shift, an increase of 30 per cent over production standards of 125 molds per shift.

A third casting (representative of many small shell castings) is produced in a 15 x 20-in., 20-cavity mold weighing 17 lb. It is shown in Fig. 3. Each mold requires ten cores (two castings per core), and allowance is made for this operation in calculating labor value per mold. Pouring weight is 18 lb, and a finished casting weighs 0.375 lb. The production rate before the incentive plan was 294 molds per shift. This figure increased to 382 molds per shift, a 30 per cent increase, after the job had been placed on incentive.

Summary—In summary, the following steps were taken to establish the incentive plan: 1. A standard weight of 5000 lb of sand-resin mix per shift was established for a dry-blended mix containing 6 per cent powdered resin (94 lb sand and 6 lb resin). 2. A range of mold



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CLECO 2000 SERIES GRINDER

The many grinding, sanding and wire-brushing operations best accomplished by vertical grinders are performed in superior fashion by this pair of CLECO Vertical Air Grinders. You'll draw extra dividends of performance, economy and safety to personnel with the outstanding CLECO Vertical Grinder team.

The Cleco 1500 Series Grinder packs great power for its size . . . does 6″ cup wheel grinding at 4500 and 6000 RPM. Ideal for general abrasive and cleaning operations . . . particularly prized as edge grinder (7″ cut-off wheel capacity). An easy-handling, versatile tool for any metalworking plant. Height 6$\frac{13}{16}$″, weight 7$\frac{3}{8}$ lbs.

For those extra-heavy-duty jobs, the Cleco 2000 Series Grinder is your tool. Designed with an unusually large rotor, this tool delivers terrific power at 4500 and 6000 RPM with a 6″ cup wheel or 9″ cut-off type wheel. A real heavyweight in work capacity, but not in size. Height 7$\frac{5}{8}$″, weight 11$\frac{3}{4}$ lbs.

A variety of wheel guards is always optional, including Cleco's super-safe integral revolving type and the straight cutaway (not illustrated).

You'll like these tools' fast cutting action . . . the high quality finish they put on your product. Your tool operators will appreciate their fine balance and "feel" . . . their low level of noise and vibration.

Ask us for brochures, catalog, or a try-out in your plant.

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Circle 649 on Page 51

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For maximum efficiency and exceptional economy rely on Indianapolis foundry coke.
Uniform structure, size and controlled coking temperature assures that "Indianapolis Quality."
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weights, based on pilot production, was determined for each job. 3. Molders' wages, for each day's production, are calculated from Table I.

A word of caution is in order.

A good incentive plan should benefit all concerned. It is well to keep in mind that an employee should produce standard weight with normal effort. Equipment and methods should be improved insofar as possible, before incentive pay is initiated, to avoid low standards. Each foundry must consider an incentive system in relation to its own conditions and requirements. The abundant literature on this subject can be surveyed fruitfully by any company interested in incentive systems. The incentive system described in this paper has worked exceedingly well at Production Pattern & Foundry Co.

Acknowledgment—The author wishes to acknowledge the assistance of J. L. Stark and the Barrett Div., Allied Chemical & Dye Corp., in preparing this article.

New Officers Are Appointed by Investment Casting Institute

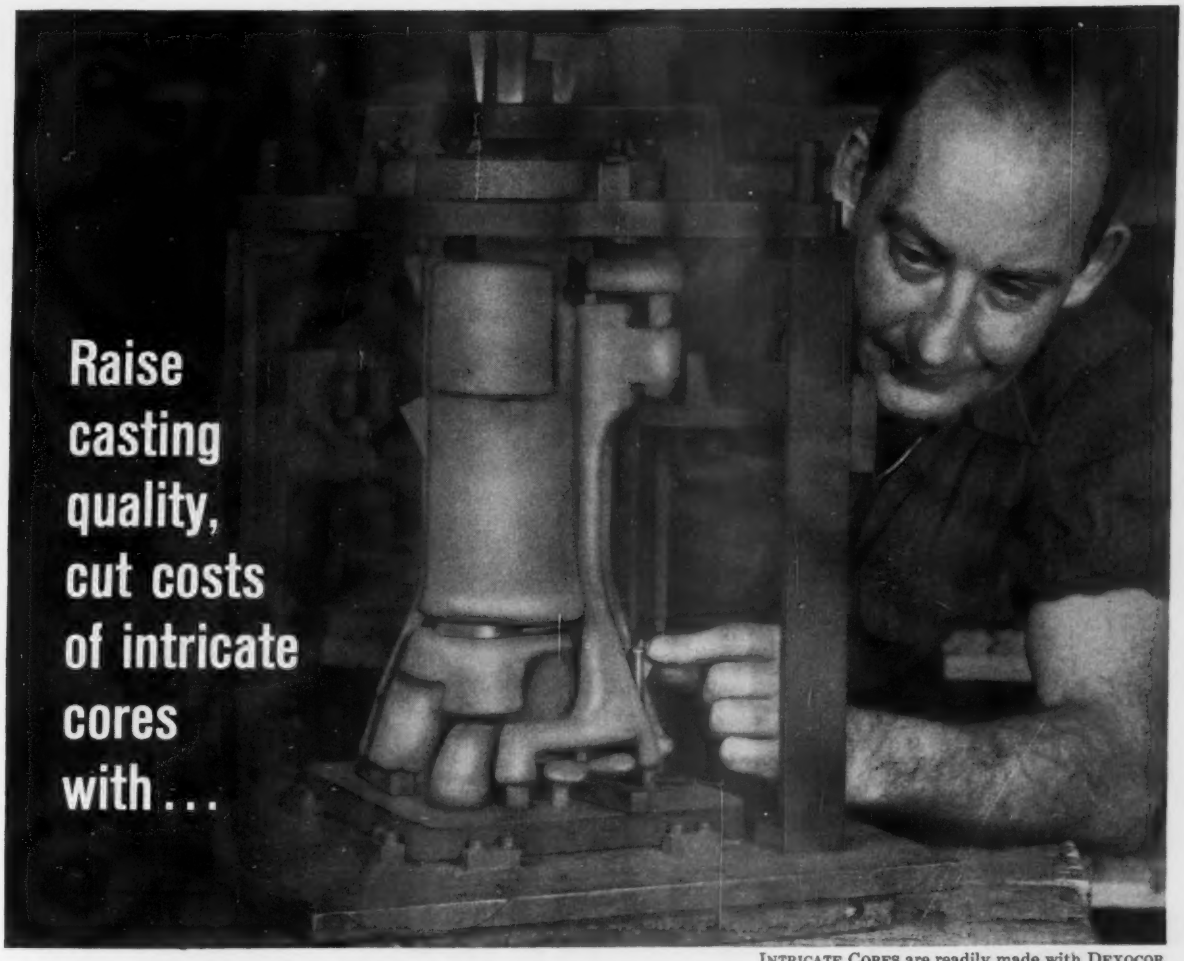
Because a combination of unexpected circumstances necessitated the resignation of P. W. Schipper as president of the Investment Casting Institute, the institute's board of directors has taken action to fill the vacancy.

Robert R. Miller, Precision Metalsmiths Inc., Cleveland, elected vice president at the group's annual meeting in November, was made president. William L. Worthen, Bone Engineering Corp., Glendale, Calif., was moved from treasurer to vice president, and Vincent S. Lazzara, Casting Engineers Inc., Chicago, was named treasurer. Harry P. Dolan continues as executive director.

Administrative and technical committees have been appointed, and plans are underway for the institute's spring meeting at the Edgewater Beach Hotel, Chicago, May 13-15.

New Firm in Core Binder Field

Core-Lube Inc., Danville, Ill., a new organization consisting largely of former employees of Swan-Finch Petrochemicals Corp., has started to market core binders, lubricating oils, and cutting lubricants. The products are comparable to those supplied by Swan-Finch before its operations were terminated.



INTRICATE CORES are readily made with DEXOCOR sand mixes. This one, being assembled in pasting frame, is typical of the complex high-precision cores produced in this foundry.

DEXOCOR® BINDER

High standards of precision at every step of production are a must in this foundry—where cast parts must be finished to tolerances measured in light bands! No wonder they changed to Dexocor, now use this amazing new binder for 19 different core sand mixes!

Exceptionally important is the marked improvement in casting quality achieved with DEXOCOR. Increased hot strength of cores combined with better collapsibility helps minimize veining and finning—interiors are now smooth, free of sand scabs and readily finished with minimum grinding.

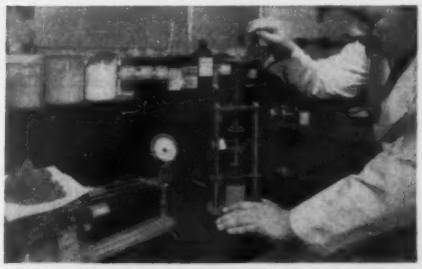
Also important is a saving of up to 50% in bake time—DEXOCOR cores are better cured after one pass through oven than former cores were after two!

Other advantages resulting from use of DEXOCOR include faster mulling, and ready control of blowability, green properties, release characteristics and baked strength.

If you are not already using DEXOCOR get detailed information—and technical help in adapting this unique new binder to your needs. Contact our nearest sales office or write:

CORN PRODUCTS SALES COMPANY
17 Battery Place, New York 4, N. Y.

DEXOCOR® *is the perfect teammate for* MOGUL® *and* KORDEK® *binders and* GLOBE® *dextrines*



EXCELLENT GREEN PROPERTIES, including greater cohesiveness, rigidity and sag resistance for cores with high stand or overhang, are imparted to cores by DEXOCOR.

BAKED CORES made with DEXOCOR sand mixes withstand heat and pressure of hot metal, yet readily shake out, leaving clean, smooth interior surfaces in castings.

Circle 651 on Page 51

Literature for Foundrymen

Stopper Heads

First in a series of brochures on the care and use of stopper heads tells how they are packed and offers tips on how to reduce stopper damage in plants.—Joseph Dixon Crucible Co., Crucible & Refractories Division, Wayne & Monmouth Sts., Jersey City 3, N. J.

For More Details Circle No. 444—Page 167

Gas Burners, Furnaces

Industrial gas burners, furnaces, and accessories for heat treating, metal melting, soldering, and drying are illustrated and described in

Catalog 1570.—Charles A. Hones Inc., 2463 Grand Ave., Baldwin, L. I., N. Y.

For More Details Circle No. 445—Page 167

Saw Blade Chart

To aid in selecting the proper saw blade for specific sawing jobs, this wall chart lists factors affecting cutting rate, tool life, and finish for 48 metals.—DoAll Co., Des Plaines, Ill.

For More Details Circle No. 446—Page 167

Safety Shoes

Details of 72 different safety shoe styles including a buying guide on how to select shoes for different conditions and hazards are provided in catalog.—Lehigh Safety Shoe Co., Emmaus, Pa.

For More Details Circle No. 447—Page 167

Carbon Sand

Pocket-size booklet describes a molding material consisting of particles of hard carbon for use as a mold and core facing. Typical mix formulas are given.—J. S. McCormick Co., 25th St. and A. V. R. R., Pittsburgh 22, Pa.

For More Details Circle No. 448—Page 167

Cope and Drag Sealer

Technical Bulletin SG756 describes and explains the use of an extruded plastic sealing compound to be laid on the parting line of a mold.—Thiem Products Inc., Milwaukee 19, Wis.

For More Details Circle No. 449—Page 167

Industrial Hose

Catalog 57 describes hose couplings, stems, swivels, and accessories, provides mounting instructions, and offers tips on hose selection.—J. N. Fauver Co., 49 West Hancock Ave., Detroit 1, Mich.

For More Details Circle No. 450—Page 167

Infra-red Heaters

Infra-red radiant heaters fired by natural or LP gas are described and illustrated in controlled heat applications for high bay buildings.—Perfection Industries, 1135 Ivanhoe Rd., Cleveland 10, Ohio.

For More Details Circle No. 451—Page 167

Coated Abrasives

Catalog and price list covers paper and cloth-backed abrasives in sheet, disc, roll, and belt form.—Armour Coated Abrasives Division, Armour & Co., Alliance, Ohio.

For More Details Circle No. 452—Page 167

Ductile Iron

Booklet describes the properties of ductile iron and presents 24 case histories illustrating use of the metal for several parts of varying sizes.—International Nickel Co., Reader Service Section, New York 5, N. Y.

For More Details Circle No. 453—Page 167

Patterns

Design, engineering, and production facilities for wood, metal, and plastic patterns, coreboxes, driers, fixtures, and core pasting units are described in booklet.—Motor Patterns Co., 3035 East 61st St., Cleveland 27, Ohio.

For More Details Circle No. 454—Page 167

Fluid Cylinders

Temporary Bulletin SS-58 describes air and hydraulic cylinders available in sizes from 1½ to 8 in. in diam. in a variety of mounts.—Hydro-Line Mfg. Co., 5600 Pike Rd., Rockford, Ill.

For More Details Circle No. 455—Page 167

Power Roof Ventilators

Dimensions, capacity tables, and details on accessories and protective coatings for power roof ventilators

are given in Bulletin 2301.—Ilg Electric Ventilating Co., 2850 North Pulaski Rd., Chicago 41, Ill.

For More Details Circle No. 456—Page 167

Quiet Air Tools

Line of air tools completely redesigned to achieve noiseless, blastless exhaust is described in literature.—Aro Equipment Corp., Bryan, Ohio.

For More Details Circle No. 457—Page 167

Refractories

Bulletin 108 deals with high-alumina refractory standard brick, special shapes, and ramming mixes.—Ironton Fire Brick Co., Ironton, Ohio.

For More Details Circle No. 458—Page 167

Abrasive Segregator

Data sheet contains specifications on a vibrating screening device for

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404	424	444	464	484	504
405	425	445	465	485	505
406	426	446	466	486	506
407	427	447	467	487	507
408	428	448	468	488	508
409	429	449	469	489	509
410	430	450	470	490	510
411	431	451	471	491	511
412	432	452	472	492	512
413	433	453	473	493	513
414	434	454	474	494	514
415	435	455	475	495	515
416	436	456	476	496	516
417	437	457	577	597	517
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separating blast cleaning shot from slag, sand, and other foreign material.—P.A.C. Mfg. Co., 210 West Burlington Rd., La Grange, Ill.

For More Details Circle No. 459—Page 167

Aluminum Flux

Booklet, "Apex Flux Data," describes five fluxes for cleansing, degassing, and refining the grain in several types of aluminum alloys.—Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.

For More Details Circle No. 460—Page 167

Foundry Resins

Booklet CDC-344 covers phenolic resins, including those for foundry use.—General Electric Co., Chemical Materials Dept., One Plastics Ave., Pittsfield, Mass.

For More Details Circle No. 461—Page 167

Rare Earth Metals

Product data on rare earth metals and alloys plus 83 references to their use in ferrous and nonferrous alloys are offered.—New Process Metals Inc., 45-65 Manufacturers Place, Newark 5, N. J.

For More Details Circle No. 462—Page 167

Ladle Heater

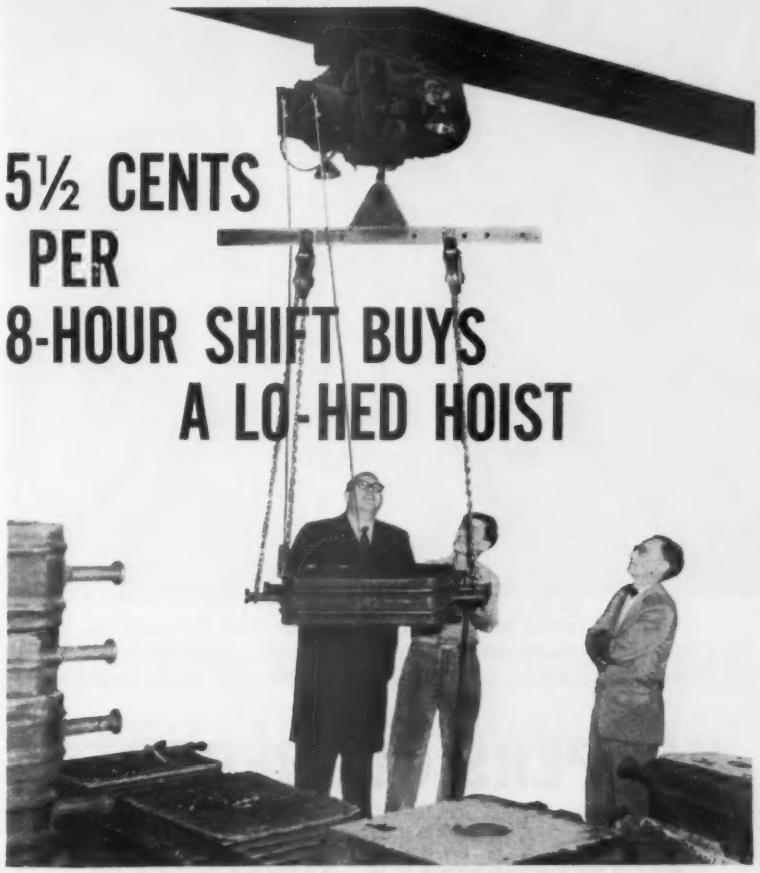
Leaflet describes adjustable, swinging arm ladle heater which may be fired by either gas or oil.—Monometer Mfg. Co., Savoy House, 115-116 Strand, London, W.C. 2, England.

For More Details Circle No. 463—Page 167

Abrasive Belt Grinders

Booklet, "How Abrasive Belt Grinding Increases Production at

"Well, whose idea was it—to teach this cute trick to 'Daddy's widda foundryman'?"



5½ CENTS PER 8-HOUR SHIFT BUYS A LO-HED HOIST

Ed. Boyer, Sales Manager of American Engineering Company's Materials Handling Division, inspects 26-year-old Lo-Hed hoist with James Gift, Molder, and Russell Miller, Purchasing Agent for Dodge Steel Company, Philadelphia, Mr. Miller writes:

"When you first asked if we still had this hoist in use, we were tempted to say no without checking because (1) we like to think our plant is too modern to have anything in it over 26 years old, and (2) it seemed impossible for a hoist to hold together over 26 years in our type of service.

"Therefore, the fact that this hoist is still very much in use in our plant today indicates that it is still considered modern in design and efficient in operation.

"Moreover, as repair part purchases have been very low, it would seem that this hoist still has many more years of useful life left in it."

Lo-Hed Electric Hoists cost less because they last longer

Based on current prices, this Lo-Hed Hoist at Dodge Steel shows a capital cost of less than 5½ cents per 8-hour shift . . . and it looks good for another 26 years of valuable service.

Just give us the details—there's a Lo-Hed exactly right for your job

Lo-Hed's are available with headrooms as low as 11"; capacities ¼ to 12 tons; all control types, two-speed included; 5 suspensions; shrouded bottom block; 2 automatic brakes; anti-friction bearings throughout. They're full load tested, and adaptable to any crane or monorail system. Look in your classified telephone directory under "A-E Lo-Hed Hoists" for your nearest representative.

For helpful information on hoists, fill out and mail this coupon today.

Please send me a copy of your booklet on:

☐ "How to select the proper hoist to meet your needs."

☐ "Five things to consider before you buy that hoist."

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Company.....

Address.....

City..... Zone..... State.....

H-173

DISTRIBUTORS AND AGENTS: Distributorships and agencies for Lo-Hed Electric Hoists are available in many parts of the country. If you are interested, call or write Ed Boyer, Sales Manager, A-E's Materials Handling Division.

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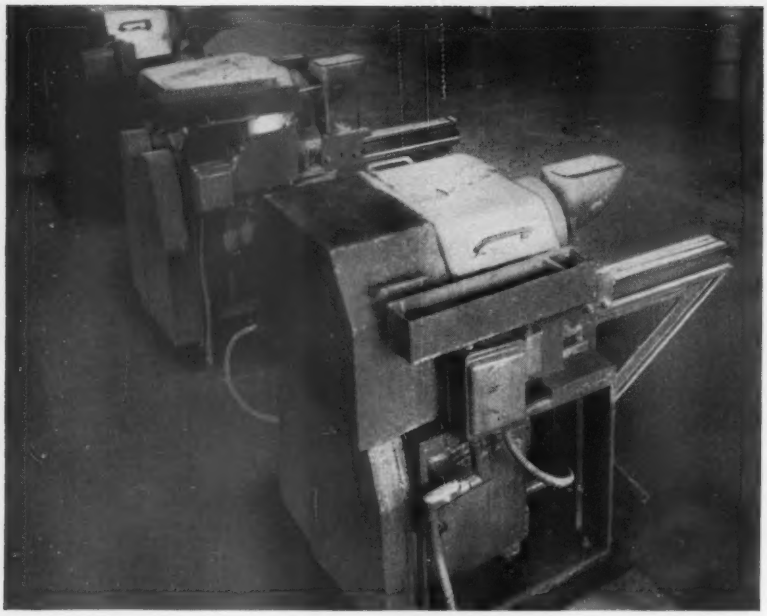


Centrifugal casting machines for casting piston rings at Koppers Co. foundry, Baltimore, Md. Shamva Mullite SM-100 is used to coat the centrifugal molds for these machines to achieve good surface finish.

KOPPERS CO. REPORTS "EXCELLENT RESULTS"

WITH SHAMVA MULLITE SM-100 CORE WASH

At the Koppers Co. foundry, in Baltimore, Md., Shamva Mullite SM-100 core wash delivers "excellent results." In this plant, Shamva Mullite SM-100 is used to coat centrifugal molds in which are cast all kinds of metal. Here are five reasons why SM-100 is ideally suited to the operation:

1. Good surface finish
2. Doesn't settle out of suspension
3. Easily applied with brush or spray
4. Cuts machining costs
5. Prevents mold sticking

SHAMVA MULLITE SM-100 is shipped dry in 90 lb. bags. For complete details, contact your local Shamva Mullite representative. He's in the Yellow Pages under "Refractories." Or write to *Mullite Works, Refractories Division, H. K. Porter Company, Inc., Shelton, Conn. In Canada, H. K. Porter Company (Canada) Ltd., Guelph, Ontario.*

H. K. PORTER COMPANY, INC.
REFRACTORIES DIVISION

Lower Cost," presents case histories of abrasive belt applications to emphasize their production versatility. —**Engelberg-Huller Co.**, 831 West Fayette St., Syracuse 4, N. Y.

For More Details Circle No. 464—Page 167

Dust Collectors

Bulletin A-9157 covers wet and dry dust collectors and auxiliary equipment, including cyclones, centrifugal and dynamic washers, dust and fiber filters, discharge gates, and trickle valves.—Ducon Co., 147 East Second St., Mineola, L. I., N. Y.

For More Details Circle No. 465—Page 167

Truck Operator's Guide

Information on lift truck construction, operation and maintenance, plus data on handling and stacking techniques are contained in "Lift Truck Operator's Guide."—Towmotor Corp., 1226 East 152nd St., Cleveland, Ohio.

For More Details Circle No. 466—Page 167

Equipment and Service

Booklet "This Is National" describes sand preparation and handling equipment and explains the company's foundry engineering and service operations.—National Engineering Co., 646 Machinery Hall Bldg., Chicago 6, Ill.

For More Details Circle No. 467—Page 167

Heat Treating Fixtures

Illustrations, specifications, and applications of 16 basic heat treating fixtures are provided in Catalog M-7.—**Wiretex Mfg. Co.**, Ten Mason St., Bridgeport, Conn.

For More Details Circle No. 468—Page 167

Handling Bulk Materials

Bulletin GFH-1157 presents new line of bulk pneumatic conveying, ash handling, dust control, and air classifying equipment.—Fluor Products Co., Whittier, Calif.

For More Details Circle No. 469—Page 167

Air Compressors

Stationary compressors using the rotary principle of compression and available in 20 to 40 hp sizes are shown in Folder E-269.—Davey Compressor Co., Kent, Ohio.

For More Details Circle No. 470—Page 167

Snagging Wheels

Typical applications, ranges, and specification table for snagging

wheels for small castings and steel slabs are contained in bulletin. — **Simonds Worden White Co.**, 1101 Negley Place, Dayton 7, Ohio.

For More Details Circle No. 471—Page 167

Vacuum Furnace

Induction heated vacuum melting furnace with melt capacity of 50 lb of steel or equivalent volume of other metals is described in Data Sheet 660.—F. J. Stokes Corp., Vacuum Equipment Division, 5500 Tabor Rd., Philadelphia 20, Pa.

For More Details Circle No. 472—Page 167

Rider-walkie Trucks

Operating features of pallet, platform, stacker, and tractor rider-walkie trucks are described in brochure.—Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

For More Details Circle No. 473—Page 167

Compressed Air Processing

Brochure 589 tells the advantages of proper air line installation, filtration and pressure regulation of compressed air, and air-tool lubrication. —C. A. Norgren Co., Englewood, Colo.

For More Details Circle No. 474—Page 167

V-belts

Pocket size Booklet S-51107 deals with the testing, inspection, and quality control of raw materials and finished v-belts.—Goodyear Tire & Rubber Co., Dept. 794, Akron 16, Ohio.

For More Details Circle No. 475—Page 167

Portable Electric Tools

Full line of electric tools and accessories is presented in 1958 Catalog F-14340.—Skil Corp., 5033 Elston Ave., Chicago 30, Ill.

For More Details Circle No. 476—Page 167

Photodrawings

Pamphlet P-22 describes the technique of using photographs to convey engineering drawing information—Eastman Kodak Co., Rochester 4, N. Y.

For More Details Circle No. 477—Page 167

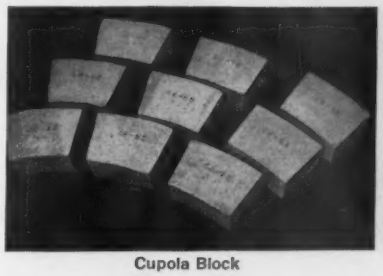
Industrial Ovens

Descriptive sheet covers construction, heating system, temperature control, and safety system for ovens offered in seven sizes.—Despatch Oven Co., 619 N.E. Eighth St., Minneapolis, Minn.

For More Details Circle No. 478—Page 167

Laclede-Christy Slag and Breast Block

Laclede Slagtite



Cupola Block

Spout Runner Tile

Wherever you are
LACLEDE REFRACTORIES ARE LESS THAN 24 HOURS AWAY

LACLEDE-CHRISTY WAREHOUSES—together with 204 dealers and distributors across America—can deliver the refractories you need to your plant within 24 hours—often less.

FIVE REASONS YOU BENEFIT by using Laclede-Christy local stocks:

- **Greater Furnace Availability.** Fast local delivery saves downtime—keeps production up.
- **Lower Capital Investment.** Taxes, insurance, and inventory costs are reduced.
- **Fewer Inventory Losses.** Less chance of refractory damage while in storage.
- **Increased Production Space.** You can convert storage area into manufacturing space.
- **Lower Labor Costs.** Laclede refractories are delivered right to the point where used.

With plants near every major producing district, and a sales and distribution organization of over 250, Laclede-Christy is able to offer swift, *specialized* service for your foundry needs.

THE YELLOW PAGES, under "Refractories", will give you the name of your local field representative or distributor. Contact him for information, or write to *Laclede-Christy Works, Refractories Division, H. K. Porter Company, Inc., St. Louis 10, Mo. In Canada, H. K. Porter Company (Canada) Ltd., Guelph, Ontario.*

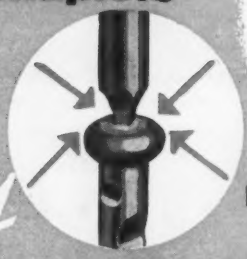
For free catalog No. 46, titled "Laclede-Christy in the Foundry", write on your letterhead to the address above.

H. K. PORTER COMPANY, INC.
REFRACTORIES DIVISION

Only fine FANNER

shoulder radiator chaplets

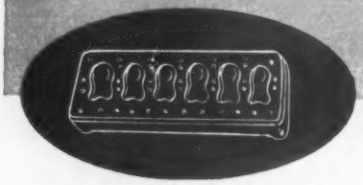
have the exclusive



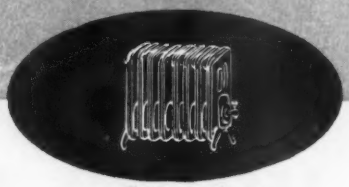
4 way break-off nick

to improve production... save money

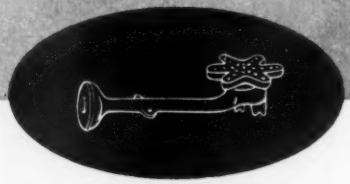
IDEALLY SUITED FOR



automotive castings



radiator castings



stove parts castings

EXCLUSIVE *New* 4-WAY BREAKOFF NICK

Provides maximum support during pouring, yet stem breaks off easily in any direction so that the few remaining after shake-out can be easily brushed off with no apparent surface marks remaining.

STAGGERED KNITTING NICKS

Provides better type of surface for knitting with molten metal, assuring thorough fusion and resulting in clean, solid castings.

STURDY SHOULDER AND SOLID RIVETED HEAD

Shoulder is designed and placed to permit chaplet to be set into pattern required distance without guesswork. Solid riveted head exactly at right angles to stem to insure that chaplet is always perfectly "true".

For better quality castings, for time and money savings in production use fine FANNER radiator chaplets. The exclusive four way break-off nick plus their other features speeds production of cleaner, sounder castings and reduces labor costs.

The development of the 4 way break-off nick is one more example of Fanner's constant study and engineering based on more than 60 years of experience in foundry practice.

Fine FANNER Radiator Chaplets are particularly suited for light pressure castings such as gas burners, radiator sections, manifolds and others. They are designed for use with the side of the greatest bearing surface against the green sand and will support approximately 5 pounds per square inch load.

Get complete information on FANNER Radiator Chaplets with the "4 way break-off nick" and other fine FANNER chaplets by writing for the FANNER Chaplet catalog today!

Qualified and specialized engineers in Fanner's Technical Service Division are available for consultation, without obligation, on problems of producing more intricate castings; developing increased strength, closer tolerances, and better quality; reducing machining and improving finish — both in ferrous and non-ferrous castings. Take advantage of the research and development work that Fanner has invested in this field to improve your profit picture! Simply direct your request to the address shown below.

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Designers and Manufacturers of Fine Fanner Chaplets and Chills

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MALLEABLE FOUNDERS' SOCIETY

Holds Semiannual Meeting at Cleveland

EXPECTATIONS of a relatively slow first half in business and plant operations were voiced by member foundries at the semiannual meeting of the Malleable Founders' Society held at Cleveland, Jan. 17. There are some prospects, however, for recovery later in the year.

The meeting, presided over by society president Phil C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill., was devoted partly to discussion of some committee activities.

Gordon B. Mannweiler, Eastern Malleable Iron Co., Naugatuck, Conn., reported as chairman of the Research and Technical Council on various current and future projects. These studies include such subjects as trace elements in malleable iron, straightening, surface hardening, hot tears, corrosion resistance, damping capacity, and machinability. Favorable results of the recent study of high-temperature performance of malleable iron are expected to open new opportunities for applications of malleable castings in high-temperature service.

Some details of the society's new redesign and conversion contest were discussed by Lloyd E. Young, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., and chairman of the Market Development Council. The 1958 Market Development Conference to be conducted by the council is scheduled for April 9-10 at the Edgewater Beach Hotel, Chicago.

Discussing the outlook for industries having a relatively large number of employees, Lowell D. Ryan, executive vice president of the society, pointed out that in recent years they have not fared as well profit-wise as have those with the lowest employment.

A motion picture of an automatic molding and pouring installation at the George Fischer malleable foundry in Switzerland was presented by William Illuminati, chief engineer, American Automation Corp., New York. This installation produces 300 molds an hour with nine men, not including core setters. Flasks are 22 x 27 in., 6 to 12 in. high. Manhours per ton of castings produced vary from 3 for an overage casting weight per mold of 20 lb to 1 manhour for 60 lb of casting weight.

Automated operations include molding, closing of molds, weighing of molds, pouring, mold cooling and shakeout, sand feed and return, mold separation, and return of bottom plates, and cope and drag flasks.

All program cycling devices operate on the mechanical-pneumatic principle. An electrical system indicates the location of malfunctioning of any major elements of the installation.

The molding units are designed to permit the change of a pattern plate within about one minute. Standardized pattern frames allow the mounting of patterns on the full-size plate or on segments of it. It is also possible to use a different flask height for each of the three molding stations. The system makes runs of as few as 100 castings economically feasible.

Executive Committee of the Malleable Founders' Society at the recent semiannual meeting. Left to right are Leon J. Wise, Chicago Malleable Castings Co.; Philip C. DeBruyne, Moline Malleable Iron Co.; Richard W. Crannell, Lehigh Foundries Co., and Lowell D. Ryan, executive vice president of the society

FEF College-Industry Meeting Will Consider Future Trends

"Science and Engineering—the Key to the Foundry Industry's Future" will be the theme of the 11th annual Foundry Educational Foundation College-Industry Conference. The meeting will be held at Hotel Statler, Cleveland, March 12-13.

The program includes two panel discussions. One will cover new aspects of engineering education in cast metals; the other will develop an expanded FEF program to provide technicians, engineers, and scientists for the industry. Key professors from 8 of the 17 FEF schools will report on the newest developments in cast metals on their campuses.

Dr. Clyde E. Williams, former president, Battelle Memorial Institute, will speak at the annual banquet on "A Look into the Future of Cast Metals." Dean Clement J. Freund, University of Detroit, will address the luncheon, March 12, on "The Foundry Industry's Need—from Craftsman to Scientist."

Program details follow:

Wednesday, Mar. 12

8:30 a.m.—Registration—Pine Room.

9:30 a.m.—Opening Remarks — President C. V. Nass.

9:45 Panel: "Engineering Education in Cast Metals for the Future," W. B. Bishop, Archer-Daniels-Midland Co., Cleveland, presiding. Members: C. F. Walton, Gray Iron Founders' Society; J. H. Lansing, Malleable Founders' Society; H. F. Scobie, Non-Ferrous Founders' Society; and C. W. Briggs, Steel Founders' Society of America.

12:15 p.m.—Luncheon: "The Foundry Industry's Needs — from Craftsman to Scientist," Dean Clement J. Freund, College of Engineering, University of Detroit.

2 p.m.—University Reports: "New Developments in Cast Metals on the Campus"—E. Paul DeGarmo, California; D. C. Williams, Ohio State; C. T. Marek, Purdue; and J. L. Leach, Illinois.

3:20 p.m.—Annual Meeting: Reports of the president, secretary-treasurer, nominating committee, election of officers and trustees-at-large, resolutions.

4 p.m.—Trustees Meeting, 1958-59.

6 p.m.—President's Reception—Grand Ball Room.

7 p.m.—Banquet: "A Look into the Future of Cast Metals," Dr. Clyde E. Williams, president, Clyde E. Williams & Co., Columbus, Ohio.

Thursday, Mar. 13

9:30 a.m.—University Reports: M. S. Burton, Cornell; D. S. Eppelsheimer, Missouri School of Mines; R. A. Flinn, Michigan; and H. F. Taylor, M. I. T.

10:30 a.m.—Panel: "An Expanded FEF To Meet the Needs of the Foundry Industry," Frank G. Steinebach, moderator. The College (Undergraduate) Program, M. J. Allen, American Steel Foundries; Technical Institute Program, T. T. Lloyd, Albion Malleable Iron Co.; Graduate Study Program, Walter Sicha, Aluminum Co. of America; and Design Engineering Program, George K. Dreher, Steel Founders' Society of America.

12:25 p.m.—Luncheon: Conference summary and concluding remarks by the new FEF president.

DEPENDABLE TEMPERATURE
CONTROL
Check your molten metal temperatures often with Marshall Enclosed-Tip Thermocouples to insure real temperature control. This will assure pouring neither too hot nor too cold, but at just the right heat.
Thus Marshall Thermocouples will aid you to produce sound, dense castings. They will help to eliminate casting flaws, such as misruns, pinholes, excessive shrinkage — cut costs and increase output.
Couple wires in these instruments are swaged into the tip, and insulated from contact throughout the tube. Readings are instant and exact.
L. H. MARSHALL CO.
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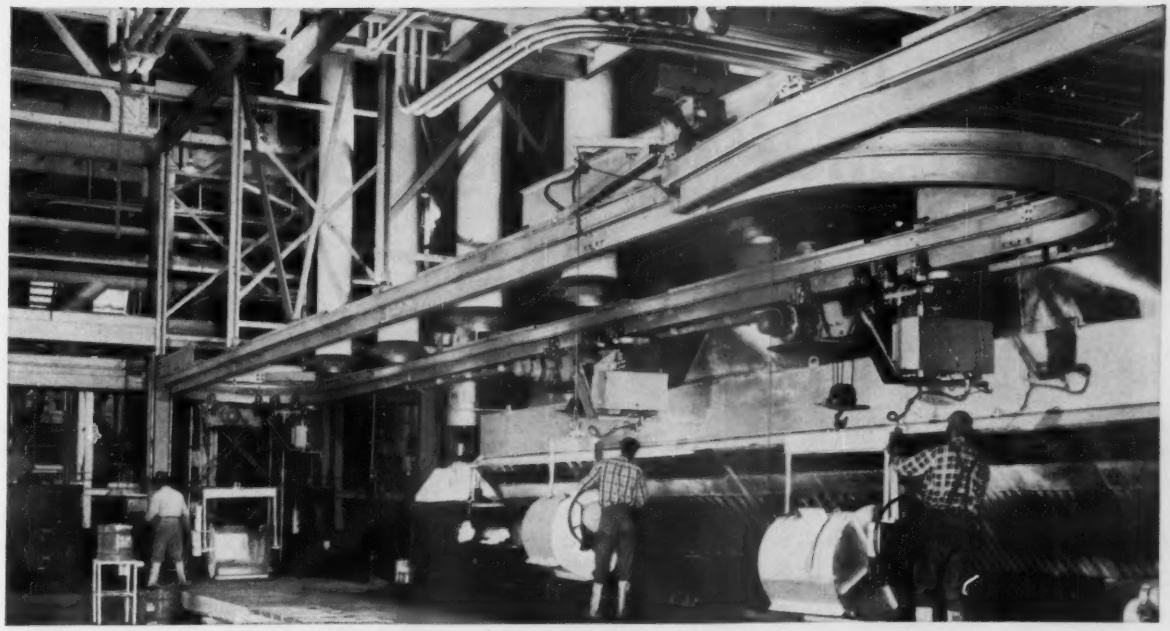
THERMOCOUPLES

Starts New Ferro-Alloy Plant

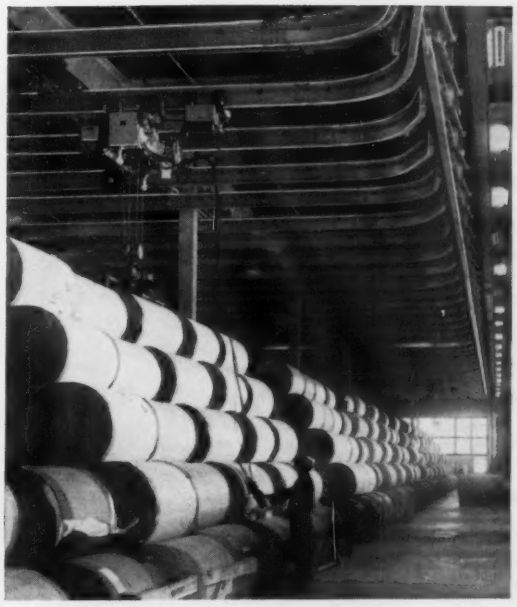
First of three large modern electric submerged arc furnaces to be put into operation to produce silicon metal for the aluminum and chemical industries as well as high grade ferro-silicons for the iron and steel industry was turned on recently at Ohio Ferro-Alloys Corporation's new reduction plant near Powhatan Point, Ohio.

Known as the Powhatan plant, it will be the fourth operated by the company and will cost more than $3 million. Some of the key personnel have been moved from other plants of the company, including Thomas Casto who was transferred from Tacoma, Wash., and will manage the new facility. Company's home office is located in Canton, Ohio.



Here's a way to make your lost ceiling space pay off

AMERICAN MONORAIL



Floor space is unobstructed, free of traffic with American MonoRail overhead handling.

increases plant capacity... cuts handling costs... reduces worker fatigue... minimizes damage and loss.

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OVERHEAD HANDLING EQUIPMENT

MEMBER OF MATERIALS HANDLING INSTITUTE AND MONORAIL MANUFACTURERS ASSOCIATION

AFS INSTITUTE
Expands Training Courses

By RALPH E. BETTERLEY
Education and Training Director
American Foundrymen's Society
Des Plaines, Ill.

THE 1957 series of technical training courses sponsored by the Training & Research Institute of the American Foundrymen's Society received a tremendous response from the foundry industry. Enrollments and enthusiasm in the courses offered far exceeded optimistic expectations of the program administrators.

With the exception of the first course, Sand Testing, all courses had capacity or near-capacity enrollments. Several courses were over-subscribed, necessitating repeat scheduling during 1957. These will also be repeated in the 1958 series.

In one instance, the course Cupola Melting of Iron was repeated Jan. 27-31, 1958, with the class size increased from 25 to 75. The course even then was over-subscribed by 24 students. It was also scheduled for Feb. 10-12 at Berkeley, Calif.

This response is highly indicative of the casting industry's desire for this type of educational program to up-grade and improve its plant personnel. That the foundry industry is also cognizant of its training needs and is willing to materially support such a broad, long-range program is reflected substantially by this early reaction as well as the favorable responses reported on course questionnaires which are completed by all participants in the program. One such unsolicited endorsement from the president of a sizable midwest foundry is as follows:

"I had the privilege of attending several of your cupola sessions and was sincerely impressed with the very capable and efficient manner in which it was handled. I believe you are doing a very worthwhile job and feel that these courses are fulfilling a critical need in the foundry industry.

"I am sure that the time and money spent attending these sessions will be repaid to us many times over, and I sincerely recommend that our member companies exert every effort to subscribe and support these courses and thus assure their continuance for many years to come."

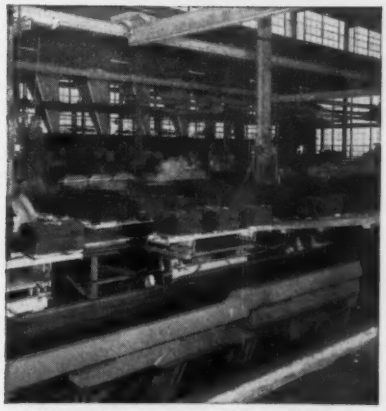
Many such qualitative compliments have been received at the AFS headquarters office, and this response parallels top management's willingness to co-operate in

SCHEDULE OF AFS 1958 TRAINING COURSES

COURSE NO.	SUBJECT & DESCRIPTION	DATES	LENGTH	WHERE	FEE
T2A-58	**Nondestructive Testing**	March 3-7	5 days	Chicago	$100
	Lecture and demonstration course for metallurgists, supervisors, industrial engineers, foremen, castings purchasers, and quality control personnel. Standard methods to test cast metals, application and interpretation. Magnetic particle, x-ray, gamma-ray, penetrants, fluorescent dyes, new developments and safe practices. Limited to 25.				
M3C-58	**Cupola Melting of Iron**	March 17-18	2 days	Hamilton, Ont.	$ 30
	Lecture course for cupola operators, supervisors, metallurgists, foremen. Basic principles for optimum cupola operation are considered. Raw materials, cupola design, quality control, combustion control, metallurgy of cast iron, safety, preventive maintenance and new developments.				
M2A-58	**Melting of Copper-Base Alloys**	April 2-4	3 days	Chicago	$ 40
	Lecture course for melters, supervisors, metallurgists, and foremen. Nomenclature, alloy classification, melting technology, equipment, quality control, testing, and raw materials. Basic control variables are considered in light of optimum results with maximum safety to personnel and equipment.				
MTY1A-58	**Metallography of Ferrous Metals**	April 16-18	3 days	Chicago	$ 40
	Lecture course for melters, supervisors, foremen, foundry engineers, researchers, laboratory technicians, metallurgists, and design engineers. History, basic metallurgy, terminology, equilibrium and phase diagrams, micro and macro analysis, physical properties based on metallographic interpretation, heat treatment, graphic representation. Equipment and basic principles of metallography.				
S1A-58	**Sand Testing**	June 2-6	5 days	Detroit	$125
	Demonstration and laboratory course. Basic testing methods and equipment are demonstrated in view of sand properties, variables and controls. Desirable course for sand technicians, foremen, supervisors, trainees, and sand suppliers. Limited to 25.				
MTY2A-58	**Metallography of Nonferrous Metals**	June 25-27	3 days	Chicago	$ 40
	Lecture course same as Course No. MTY1, except technology and principles apply to nonferrous metals.				
M3D-58	**Cupola Melting of Iron**	July 7-11	5 days	Chicago	$ 65
	(As described above for Course M3C.)				

JEFFREY helps modernize
A. C. Williams Co. foundry at Ravenna, Ohio

Jeffrey hoppers supply sand directly to molders' stations; save considerable time, effort and floor space.



Jeffrey MV conveyors move material with non-sliding, hopping action that assures long deck life; abrasive wear is negligible.

Jeffrey equipment played a major part in improving plant efficiency when A. C. Williams Co. modernized its foundry. Jeffrey overhead sand distributing systems, MV conveyors, aerators and apron conveyors are being used.

You can call on Jeffrey for equipment or for complete system engineering to improve efficiency and to boost profit. Jeffrey engineers are thoroughly familiar with all phases of foundry operations. Jeffrey-built equipment is expressly designed for the high-speed, low-maintenance operation modern foundries require.

Complete information on Jeffrey foundry equipment and service is described in Catalog 911. Write for your copy. The Jeffrey Manufacturing Company, 907 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT . . . TRANSMISSION MACHINERY . . . CONTRACT MANUFACTURING

Circle 658 on Page 51

SCHEDULE OF AFS 1958 TRAINING COURSES

COURSE NO.	SUBJECT & DESCRIPTION	DATES	LENGTH	WHERE	FEE
S23A-58	**Sand Control & Technology**	Aug. 4-8	5 days	Detroit	$ 65

Lecture course for foundrymen having had some experience in sand testing, control, and technology. Statistical controls, mold wall movement, hot deformation, creep deformation, mold atmosphere, heat transfer, mechanical sand properties, metal penetration, and quality control. Pre-requisite Course No. S1 or equivalent experience.

PM1A-58	**Patternmaking**	Aug. 18-20	3 days	Chicago	$ 40

Lecture and demonstration. Course for patternmakers, foremen, supervisors, trainees, purchasers of castings, suppliers, and management. Materials, equipment, layout, allowances, construction techniques, and recent trends. Emphasis placed on new materials, processes, techniques and their application. Limited to 25.

SAF1A-58	**Industrial Environment**	Sept. 8-12	5 days	Chicago	$ 65

Demonstration and lecture course on in-plant environmental problems and safety. Workmen's compensation, first aid, personnel protective equipment, physical examinations, occupational diseases, ventilation, radiation hazards, foundry noise are items included in the study. Appropriate for foremen, supervisors, engineers, safety men and top management.

PD1A-58	**Product Development**	Sept. 24-26	3 days	Chicago	$ 40

Lecture course on product analysis from the design to the marketing of the finished casting. Study will be made of casting design, patterns employed, equipment, cleaning of castings, cast analysis, casting processes, engineering properties of cast metals, and sales promotion. Scheduled for all types of foundry engineers, sales engineers, technicians, supervisors, metallurgists and management.

SAF2A-58	**Air Pollution Control and Legislation**	Oct. 1-3	3 days	Chicago	$ 40

Lecture course covering the laws and interpretation, problems, suggested solutions, and the drafting of intelligent ordinances from the foundrymen's standpoint. Foundry effluents, air cleaning equipment, sampling techniques are topics studied. Important course for all supervisory and management personnel.

IE1A-58	**Industrial Engineering**	Oct. 13-17	5 days	Chicago	$125

Lecture and work shop course on better standards and cost control. Rating and motion and time study techniques. Statistical and quality control methods applied to sampling procedures and standards development. Industrial engineers, cost control, time study engineers, supervisors, superintendents, and top management. Limited to 25.

GR1A-58	**Gating and Risering of Ferrous Castings**	Oct. 27-31	5 days	Chicago	$ 65

Lecture course on the various problems relating to gating and risering. Metal flow, solidification phenomena, heat transfer, shrinkage, hot tears, ferrostatic pressure, gate and riser design, mold wall movement, and surface tension are some of the many facets considered. Intended for foremen, technicians, foundry engineers, supervisors, industrial engineers, and production and quality control personnel.

IE2A-58	**Foundry Plant Layout**	Nov. 10-12	3 days	Chicago	$ 40

Lecture course on problems of rehabilitation or building of new plants. Materials handling, equipment, shop routing, storage, cleaning and shipment, safety and hygiene, production and job shop considerations are included. Foremen, supervisors, industrial and production engineers, and management.

REGISTRATIONS NOW OPEN. Reservations for all 1958 training courses should be made by the course numbers and dates given. Registrations accepted in order as received to attendance limits. Payment of tuition fees should accompany enrollment application. Make all reservations **only** with Director, AFS Training & Research Institute, Golf & Wolf roads, Des Plaines, Ill. Tel. VAnderbilt 4-0181.

providing a large percentage of the high-qualified experts needed to teach specific technical areas of the courses. According to S. C. Massari, T & RI director, "This provides an opportunity for the maximum 'know-how and why' to be given to foundrymen having practical experience but lacking the opportunity and/or the facilities for adequate technical training."

Some revealing statistics on the 1957 courses are as follows:

1. 403 students registered from 25 states, 2 provinces of Canada and 2 states in Mexico.

2. Average round-trip distance traveled per student for courses was 833.6 miles.

3. Foundry personnel made up 89 per cent of the students, the remaining 11 per cent coming from foundry suppliers.

4. Job titles ranged from trainees to presidents, with metallurgists ranking first, foremen second, superintendents third, engineers fourth, and assistant superintendents fifth. Presidents ranked twelfth.

5. Less than 30 per cent of the students enrolled for all courses came from the cities (including their immediate suburban areas) where the courses were held.

The 1958 series of courses includes several additional new courses added to courses which were heavily over-subscribed in 1957. The course numbers, descriptions, dates, locations, and fees are shown in the accompanying listing.

Book Review

Welding Handbook, edited by Arthur L. Phillips, cloth, 6 x 9 in., 560 pages, published by American Welding Society, 33 West 39th St., New York 18, N. Y. Price $9.

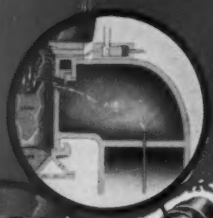
First section of the fourth edition deals with the fundamentals of welding: Standard welding terms, basic welding metallurgy, design, inspection, statistical control, engineering tables, thermal and mechanical treatment of weldments, cost estimating, and safe practices. A bibliography is included at the end of each chapter. An additional section of the book will be published each year for the next five years to keep the book up to date.

There is ONLY ONE Genuine "SHOOTER—

the HANSBERG DAVENPORT *Shooter*

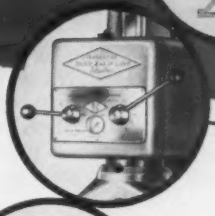
DON'T Be Confused with a Made-Over Blower

1 AIR STORED DIRECTLY BEHIND SAND No diaphragm valve or pipes to choke shoot effect. Therefore unparalleled ramming effect with least possible air consumption.

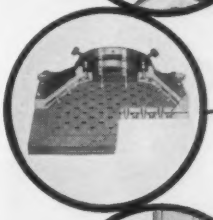


MANIFOLD CORE No [illegible] or blow hole [illegible] sand in the body of this core, which is impossible in core blow[illegible]

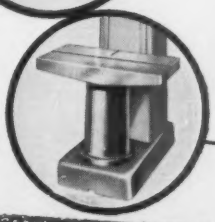
2 LARGEST POSSIBLE ANNULAR RING-VALVE (U. S. Patent) permits full air pressure to explode upon sand in shortest possible time (zero effect). Air does not get time to go through sand as in blowers, but cuts behind sand, therefore no sandblasting.



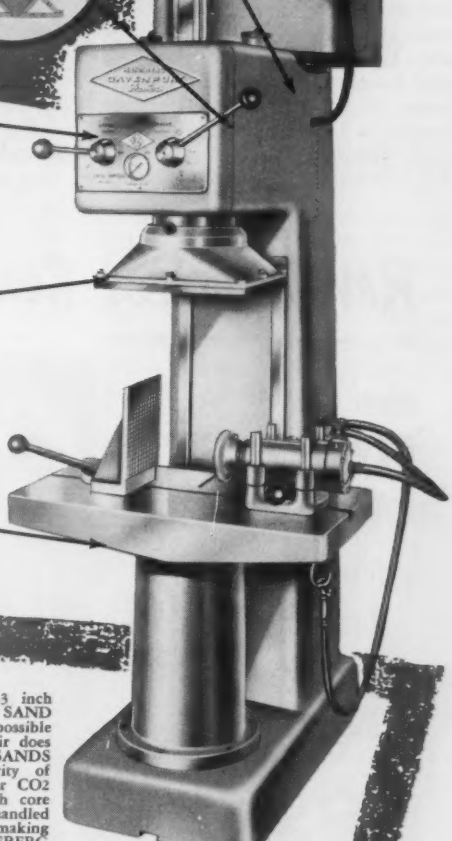
3 ONLY TWO CONTROL LEVERS. Left handle for hydraulic adjustment of table height (also hydraulic draw of core box). Right handle, semi-automatic for horizontal and vertical clamping and shooting. (Push button cycle timing is also available.)



4 SHOOTER HEADS are quick interchangeable with 3 types available — UNIVERSAL HEAD, STANDARD HEAD or SPECIAL HEAD — Built to meet special core specification.



5 RAPID CHANGE OF CORE BOXES. Adjustable table height hydraulically operated, telescoping cylinders, hydraulic AND air operated with 12 inch hydraulic and 7 inch air draw.



ADDITIONAL FEATURES

AIR CONNECTION requires only 1 inch pipe line as compared to 2½-3 inch diameter pipe lines for same size blower—Low air consumption. STOPS SAND BLASTING of core boxes—longer life of equipment. Wooden boxes possible without special attachments. VENTING is simplified since the propelling air does not mix with the sand and only atmospheric air is removed from core box. SANDS WITH EXCEPTIONAL GREEN STRENGTH can be used with majority of core boxes. High green strength sands, oil sands, molding sands, sands for CO_2 PROCESS, shell molding resin sands, resin cereal core sands, pelleted pitch core sands etc.,—which are either difficult or impossible to BLOW, can be handled by "SHOOTING". "SHOOTING" is the ADVANCED METHOD of making foundry CORES more uniform, in less time, at a lower cost. HANSBERG "SHOOTERS" is a patented method of shooting cores and at the International Foundry Exhibition held in Germany this "Core Shooter" was the outstanding machine displayed—(over 4,000 are in operation).

FIVE SIZES—"DAVENPORT SHOOTERS"
built in 5 sizes, capacities 4 - 17 - 42 - 88 - 250 pounds.

The term "Shooter" is a registered trademark of Davenport Machine and Foundry Company.

DAVENPORT MACHINE AND *Foundry Company*
Davenport, Iowa, U.S.A.

INFORMATIVE PAPERS AND SHOW

Planned by AFS for Cleveland in May

PREPARATIONS are approaching the final stages for the combined Casting Congress and Foundry Show to be conducted by the American Foundrymen's Society at Cleveland, May 19-23.

Comprehensive coverage of the newest in foundry equipment, supplies, and services will be supplied by the more than 200 firms planning exhibits in the Cleveland Public Auditorium. Latest developments in foundry practices will be discussed in the five-day program of technical sessions and shop courses.

New Officers and Directors—Formal election of new officers and directors selected by the nominating committee, as announced last month, will take place at the business meeting. Currently AFS vice president, Lewis H. Durdin, president, Dixie Bronze Co., Birmingham, has been selected to succeed Harry W. Dietert as president of the society. Charles E. Nelson, technical director, Magnesium Div., Dow Chemical Co., Midland, Mich., has been nominated vice president.

These six men were picked to serve as directors for three years:

David W. Boyd, assistant general manager, Engineering Castings Inc., Marshall, Mich., from the Central Michigan Chapter.

T. W. Curry, director of research, Lynchburg Foundry Co., Lynchburg, Va., from Piedmont Chapter.

R. R. Deas Jr., vice-president and works manager, Hamilton Foundry & Machine Co., Hamilton, Ohio, from the Cincinnati District Chapter.

Jake Dee, president, Dee Brass Foundry, Houston, Tex., from the Texas Chapter.

Webb L. Kammerer, president, Midvale Mining & Mfg. Co., St. Louis, Mo., from the St. Louis District Chapter.

H. M. Patton, manager, Foundry Div., American Hoist & Derrick Co., St. Paul, from Twin City Chapter.

For Merit and Service — Six awards will be made at the business meeting—three each for scientific merit and service citations. The society's Board of Awards has selected the following for Awards of Scientific Merit:

Mervin H. Horton, materials engineering division, Deere & Co., Moline, Ill., "for technological contributions over many years to the Gray Iron and Sand Divisions of the society."

Kenneth H. Priestley, president, Vassar Electroloy Products Inc., Vassar, Mich., "for long and conscientious effort in the development of gray iron shop course programs at the AFS annual Castings Congress."

Franklin B. Rote, technical director, Albion Malleable Iron Co., Albion, Mich., "for noteworthy contributions to the AFS Malleable Division in furthering the technical prestige of the society."

Service Citations will go to the following:

Frank S. Brewster, director of research and development, Brumley-Donaldson Co., Huntington Park, Calif., "for valuable service to the society and the castings industry in the development and dissemination of basic sand technology."

Ernest T. Kindt, president, Kindt-Collins Co., Cleveland, "for faithful and continuous service to the society and the patternmaking branch of the castings industry."

Fred G. Sefing, metallurgist, Development & Research Div., International Nickel Co., New York, "for long and conscientious service to AFS and the castings industry in fostering foundry educational programs at all levels."

Gold medal awards, the society's highest honor, will be presented at the Wednesday evening banquet. Selected for this award are:

Ralph A. Clark, manager of foundry service, Electro Metallurgical Co., division of Union Carbide Corp., Cleveland, the Thomas W. Pangborn Gold Medal "for outstanding contributions to the society and to the ferrous castings industry, especially in the field of gray iron metallurgy."

Howard J. Rose, chief metallurgist, Castings Div., Aluminum Co. of America, Pittsburgh, the William H. McFadden Gold Medal "for outstanding contributions to the society and to the light metals branch of the castings industry."

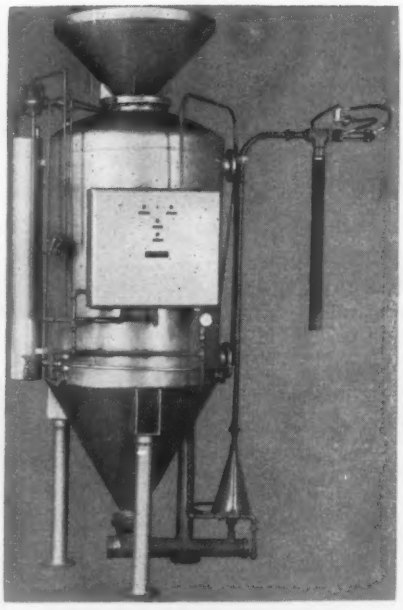
William W. Maloney, general manager and secretary-treasurer, AFS, the Joseph S. Seaman Gold Medal "for enthusiastic leadership and completely unselfish devotion to the society as its secretary and general manager."

Revolutionizes Sand Systems

the
HARTLEY
BOND FEEDER

- MEASURES
- TRANSPORTS
- SPEEDS-UP

Hartley,—originator of automatic moisture controls for sand systems, invites inquiries on its newest development illustrated here. Hopper sizes start at 28 cu. ft. Bond is transported to mixer in precisely measured quantities which can be changed instantly. May be located at floor level, or below, any distance from mixer. Ideal for multiple mixing units operating from same hopper.



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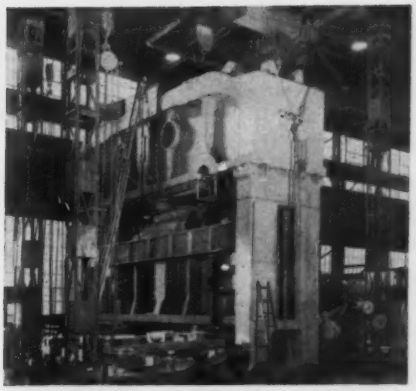
SPECIALISTS IN FOUNDRY CONTROLS
NEENAH • WISCONSIN

(Advertisement)

THERE'S A BETTER WAY . . .

"Task Force Tactics" Save Money on Tough Machinery Installations



TWO 100-TON "A" FRAMES. (CCC built) were needed to position the crown of this big Hamilton press.

YES, there's a way to make and save money when having machinery installed. First, be sure the job is handled by a professional installer. Then make certain that your professional working partner is fast, accurate and responsible.

When stubborn problems develop on a big industrial installation, only a miracle can get the project back on schedule. Commercial Contracting Corporation, a leading U. S. installer based at Detroit, has an effective solution. A task force of specialists is assigned to cover each phase of an installation. Each unit is a self-sufficient team capable of completing the job without additional help. A twin-engine airplane whisks key operating personnel from job to job. Mobile telephones link home office and project activities.

A Commercial Contracting Corporation spokesman says "The task force approach is the only positive method we have of tying together the hundreds of details in the installation of complicated machinery. Delays boost the price of the equipment. By maintaining or beating schedules, we make money for our customers."

This technique was born of necessity to keep pace with postwar industrial expansion. Yesterday's makeshift methods could not meet the challenge. Task force tactics do, and industrial installations have become a big and specialized business.

CCC's reputation, gained through the installation of seven of the 10 major automotive press plants built since 1947, now reaches into the steel, aluminum and other basic metals industries. The company, trained in serving the auto industry, applies its task force techniques to major installations of automation machinery, rolling mills, foundries, press plants and other types of manufacturing equipment.

That's why leading users agree that installing industrial machinery and equipment is not a do-it-yourself project. There's a better, faster and more economical way.

CCC's 16-page illustrated brochure, "Industrial Installations," explains these services more fully. To obtain a copy or help on your own problems, address your request to Commercial Contracting Corporation, 12160 Cloverdale, Dept. 1-F Detroit 4, Michigan.

A TYPICAL CCC "TASK FORCE" UNIT headed by J. C. McLure, *Project Coordinator*. On his left E. C. Sawyer, *Estimating Engineer*, U. A. Strang, *Director-Purchasing* and C. M. Wasson, *Company Pilot*. On Mr. McLure's right C. J. Duke, *Superintendent-Operations*. Q. C. Clark, *General Superintendent* and his *Assistant Superintendents* L. A. Watson and F. Cangemi.

Circle 661 on Page 51

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MELTING POTS
INGOT MOLDS

Designed by
FOUNDRYMEN...
for FOUNDRYMEN

You'll find it pays to standardize on Acme melting pots and ingot molds. They reduce down time and replacement costs because they're cast from a special iron formula that combines strength with high temperature resistance. They improve quality and reduce rejects, too, because they're designed for even heat distribution without hot spots. If you melt any non-ferrous metals, take advantage of our more than 30 years' experience in this field. It's your assurance of consistent high quality in Acme melting pots and ingot molds . . . designed *by* foundrymen, *for* foundrymen.

Quick delivery anywhere in the United States. Write for size list showing 40 standard sizes.

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Furnace and Oven Demand To Rise in Second Half

Suppliers See Recovery After Slow Six Months

DESPITE a sharp pickup during December in orders for industrial furnaces, ovens, and related heating equipment, no sustained recovery is looked for until the second half of 1958.

This consensus was expressed at the annual meeting of the Industrial Heating Equipment Association in Pittsburgh, Jan. 27-28. The fact that the steel and automotive industries have completed the major part of recent programs for capital expenditures is responsible in part for the present outlook.

The heating equipment industry has been exceptionally busy for several years. Although 1957 shipments are estimated by the Business and Defense Services Administration, Department of Commerce, at $203 million, off 16 per cent from the all-time 1956 peak, they were substantially above the $179 million figure for 1955 and the $166 million for 1954.

Part of last years shipments were at the expense of backlogs, however, since net orders for 1957 are estimated at 28 per cent below those of 1956. Most of the decline was in the second half. BDSA forecasts 1958 shipments of $158 million, a drop of about 22 per cent from the 1957 rate.

New Officers—C. Floyd Omstead, president, Lee Wilson Engineering Co., Cleveland, was elected president of IHEA, succeeding Walter H. Holcroft, executive vice president, Holcroft & Co., Detroit. R. L. Harper, executive vice president, Harper Electric Furnace Corp., Buffalo, was named vice president, and Ralph E. Whittaker, secretary-treasurer, Swindell-Dressler Corp., Pittsburgh, was re-elected treasurer. A. E. Tarr, assistant to the president, Leeds & Northrup Co., Philadelphia, was elevated to the executive committee, and Robert E. Fleming was re-elected executive vice president of the association.

New directors are Carl F. Burling, Lindberg Engineering Co., Chicago, Robert B. Hanna, General Electric Co., Shelbyville, Ind., and A. L. Hollinger, Surface Combustion Corp., Toledo, Ohio.

Summer Bottom—General business activity should reach bottom this summer, followed by a third quarter upturn, the meeting was told by James M. Dawson, vice

IT'S UP TO YOU!
NEED A MAN?
. . . FROM AN OUTSTANDING ENGINEERING SCHOOL
. . . WITH ENGINEERING STUDY IN CAST METALS
. . . AND, SUMMER WORK EXPERIENCE IN FOUNDRY
. . . WHO IS LOOKING FOR A CAREER IN CAST METALS
E COLLEGE

Whether he comes from the Metallurgical, Mechanical or Industrial curriculum, the FEF graduate is the product of one of the Nation's top ranking engineering institutions.

In addition, the FEF graduate has enjoyed the advantages of studying foundry as an engineering process and cast metals as an engineering material in a modern foundry laboratory under the instruction of well-known engineering educators.

Familiar with the realistic applications of engineering theory through summer student employment in foundries, FEF graduates bring to the industry a practical engineering approach.

All FEF registrants—whether Voluntary or Scholarship—have expressed a firm interest in our industry and a desire to explore its career opportunities. This desire, based upon training and experience, helps to assure our industry of a valuable source of capable and enthusiastic technical talent.

These PLUS FACTORS make the Big Difference—and set the FEF graduate engineer apart from his fellow students as a potentially outstanding foundryman.

To learn how the FEF is creating this source of technical talent, write for our booklet "Let's Look Ahead".

Foundry Educational Foundation

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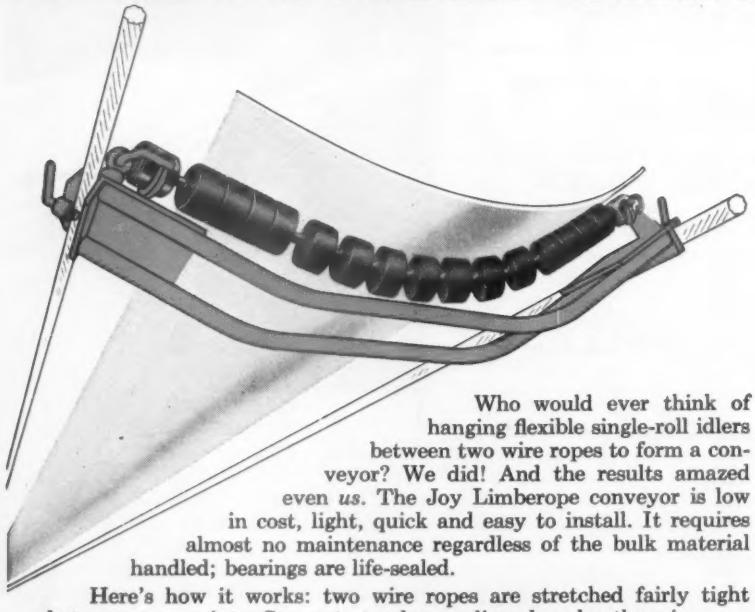
The Foundry Educational Foundation does not pay for this advertising. This space has been contributed by FOUNDRY magazine in support of FEF's constructive program for foundry industry progress through education.

NEW IDEA in conveyor design

JOY LIMBEROPE ROPE BELT CONVEYOR



Who would ever think of hanging flexible single-roll idlers between two wire ropes to form a conveyor? We did! And the results amazed even *us*. The Joy Limberope conveyor is low in cost, light, quick and easy to install. It requires almost no maintenance regardless of the bulk material handled; bearings are life-sealed.

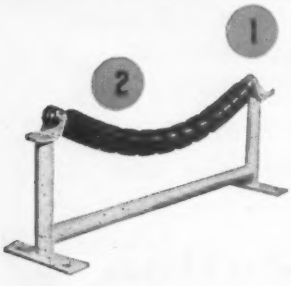
Here's how it works: two wire ropes are stretched fairly tight between two points. Support stands are slipped under the wire rope every 12 to 40 feet. Limberoller conveyor idlers are fastened by a simple lock screw at intervals determined by the material handled. Material flows better because of a unique flexing action . . . as the load comes on belt, the ropes "give," resulting in excellent troughing, less spillage even where big lumps are a problem.

That's all there is to it. Simple? You bet . . . and foolproof. Let us demonstrate how the Limberope rope belt conveyor will cut costs for you.

Write for Bulletin 217-13

NEW IDEA in conveyor belt idlers

JOY LIMBEROLLER



Radically different from all other idlers, the Limberoller is a single roll idler consisting of neoprene discs molded to a flexible steel cable. The entire idler turns on its own axis. (1) Only two bearings are used, one at either end, up out of the dirt. (2) The idler supports the belt across its entire width . . . eliminates gaps left by ordinary 3-roll idler. This even support, combined with cushioning "no-bump" action of neoprene discs, can increase belt life 6 times and more. The Limberoller can be installed on *any* belt conveyor, even on existing conveyors.

Write for Free Bulletin 217-13A

WSW L 6966-217

JOY *Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*

In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

president, National City Bank of Cleveland. Mr. Dawson said that the present recession to date almost exactly matches the trends of the 1949 and 1954 slumps but that chances for relatively early recovery are helped by the prospective upturn in federal, state, and local government spending. In the two previous dips government spending declined. He looks for this factor, plus increased expenditures by consumers, to reverse the trend of recent months.

Specific forecasts by Mr. Dawson were for an industrial production index this year of 135, against 143 in 1957, and for practically no change in the gross national product. The expected decline in spending for plants and equipment will be partially offset by rising purchases to expand inventories, he said.

Employment Was Same

Contrary to general belief, employment at the end of 1957 was about the same as a year earlier; manufacturing employment was off, but it accounts for less than 20 per cent of all workers and there were gains in other directions. Meanwhile, unemployment figures are swelled by the fact that population growth causes about 750,000 additional people to become employable each year.

Mr. Dawson thinks a government tax cut is likely to occur by July 1.

Discussing "Breakeven Analysis," Marshall Evans, Westinghouse Electric Corp., pointed up the need for a growing amount of capital to finance the greater industrial capacity which will be required in the 1960s. He analyzed the relation of prices and volume to profits, and emphasized the extent to which volume must be increased to offset price reductions, if profits are to be maintained.

Big business is getting too big, bringing on the danger of corporate socialism, it was declared by Thomas M. Evans, president, H. K. Porter Co., Pittsburgh, in addressing the banquet meeting. He suggested that the government 1) allow small firms to write off new facilities in 5 years, 2) apply depreciation methods of the 1954 tax law to second-hand machinery as well as to new equipment, and 3) set up a graduated income tax on corporations. He defined "small business" as companies with annual sales of less than $25 million and earnings of less than $2½ million before taxes are paid.

Taylor Zircon Prolongs Ladle Life...

produces cleaner metal too

Taylor Zircon No. 717 Ramming Mix is a most effective lining for ladles handling various types of iron and steel. A St. Louis foundry uses No. 717 exclusively for receiving and pouring ladles in their stainless steel and high alloy operations. They call it the best lining material they have ever used, because:

Photo shows the condition of a Taylor Zircon No. 717 lining of a 500-lb. ladle after 80 days' service in an Indiana foundry. At this plant, one ladle for cast iron and one for steel were lined with Taylor Zircon on the same day. The iron ladle was in service for 205 days; the steel ladle for 119 days . . . both with minor patching. Eight iron heats or six steel heats are melted here in a nine-hour day. How does this compare with your ladle lining life?

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Circle 665 on Page 51

Around the Country

NEWS REPORTS FROM

Chicago . . . Pittsburgh . . . Detroit . . . Philadelphia

Detroit—Resumption of shell molded pearlitic malleable crankshaft production for 1959 Pontiacs is a possibility at Central Foundry Division of General Motors Corp. Presumably the cranks would be cast at the Danville, Ill., plant which produced them for the 1956 Pontiacs. Forged crankshafts were used in the 1957 and 1958 models.

There is talk again that a cast crankshaft will be used in the 1959 Chevrolet. Although that also was rumored for the 1958 model, the shift never took place. Other conjecture for the future concerns the possibility that Chevrolet may be aiming at diecasting an aluminum block for six cylinder engines at its Massena, N. Y., plant. It is reported that introduction is scheduled for 1961.

Talk of possible use of aluminum blocks has circulated off and on since plans were revealed for the Chevrolet plant at Massena and the Ford aluminum castings plant at Sheffield, Ala. The Ford plant currently is in partial operation, producing relatively small parts in diecasting and permanent mold machines.

The fact remains, however, that automotive companies are showing considerable interest in diecast aluminum blocks. A large aluminum supplier and an automotive company have co-operated in developing an engine to be constructed mainly of diecast parts. The parts can be assembled to form a four, six, or eight-cylinder engine. A horizontally opposed six-cylinder model, currently operating on a test block, has proved extremely satisfactory in dynamometer and other tests. Another aluminum supplier is making patterns for a sand-cast prototype V-8 block designed for permanent molding. This work is being done for another of the automotive companies.

Iron foundries are not standing still as these plans for the future develop. The Buick foundry in Flint, Mich., reportedly is revamping six of its green sand molding lines as part of a modernization and automation program. Ford's Specialty Foundry in Dearborn has received bids from several equipment suppliers on installation of reclamation equipment for used shell molding sand.

In keeping with the generally slackened business pace, a recent trend in a major manufacturer's automobile production shows that production of six-cylinder cars currently is about three times the 1957 rate.

NEW PRODUCT: Pittsburgh Coke & Chemical Co. recently adapted, at a cost of $2½ million, one of its Neville Island, Pa., blast furnaces to the production of ferromanganese and spiegeleisen. The furnace also will continue to be used to produce all grades of merchant pig iron. Daily productive capacity is 900 tons of pig iron or 600 tons of spiegeleisen or 400 tons of ferromanganese. The furnace is 95 ft high and has a 22-ft-diam hearth. Twelve tuyeres admit combustion air at 1600° F. In the view above a workman makes a final check on the newly relined furnace. Another workman's head can be seen in one of the tuyeres. Pipes on the floor are designed for pre-injection of heated air for drying the furnace.

Pittsburgh—Foundries in this area continue to report slack sales. Demand is particularly slow on the part of railroads, steel mills, and mines. Several foundries supplying automakers reported a fairly strong order volume in early January, but this business began to decline late in the month and in February.

Generally, foundrymen foresee no immediate improvement in the market situation, although several foundries believe that the low point in their sales curve was reached in January, with sales in February on a par with that month. With steel mills operating below 60 per cent of capacity, their equipment needs were slim, while railroads did "virtually no buying in January," according to one supplier.

In the face of low sales volume, foundries are concentrating on keeping equipment in good repair, rather than placing many orders for new equipment. Although few expansion plans are being mapped, sellers of foundry equipment are not pessimistic. They enjoyed a fair rate of orders in January for replacement or repair of equipment. In addition, new equipment orders improved from December levels. Equipment orders are not expected to make significant gains until steel mill operations improve.

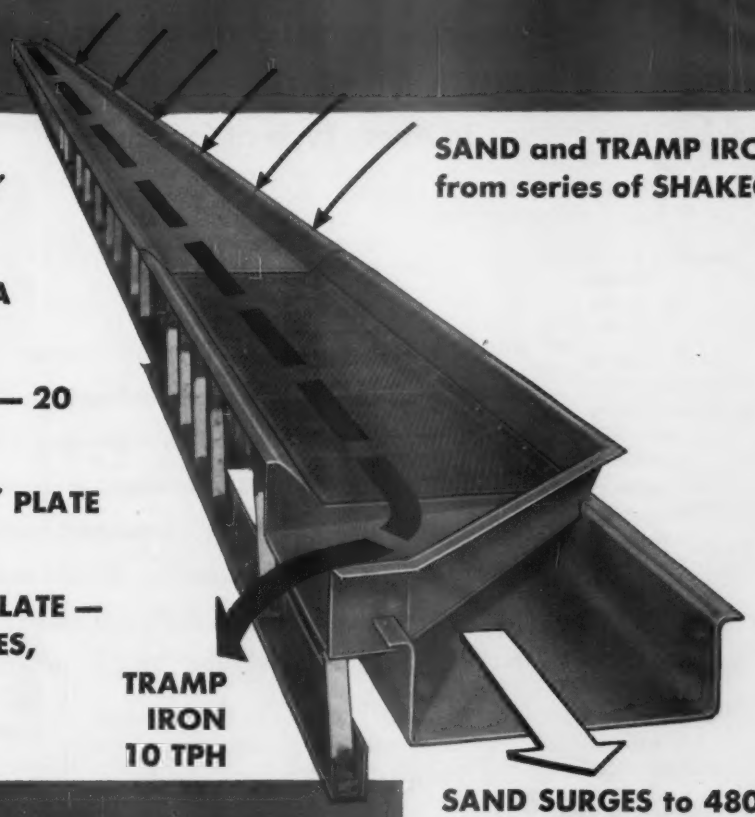
Chicago—A new air pollution ordinance described as "the most modern in the nation," was introduced in Chicago city council on Jan. 17. The proposed ordinance is completely new and establishes higher standards than the present

CARRIER BUILDS THEM

BIG *and* RUGGED

ONE PATENTED DRIVE

MEANS LONG LIFE, LOW OPERATING COSTS!



- LENGTH — 120'
- WIDTH — 4' OA
- HORSEPOWER — 20
- TROUGH — 3/4" PLATE
- PERFORATED PLATE — 1" x 1 1/2" HOLES, 15' LONG

SAND and TRAMP IRON from series of SHAKEOUTS

TRAMP IRON 10 TPH

SAND SURGES to 480 TPH

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Please rush complete information about Carrier Natural - Frequency Vibrating Equipment for foundries.

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Knight clients represent the entire cross-section of various foundry types: grey iron, steel, malleable, brass and bronze, magnesium and aluminum. Knight experience in small and large foundries covers all kinds of castings: green sand, dry sand, cement, plaster, "shell molds", permanent molds, centrifugal, die casting and investment casting. Knight assignments have ranged from the solution of a single problem in one department to the layout, design and supervision of construction of complete new plants.

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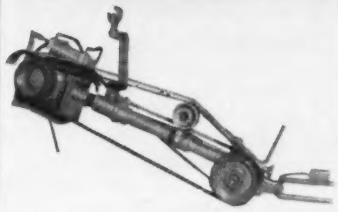
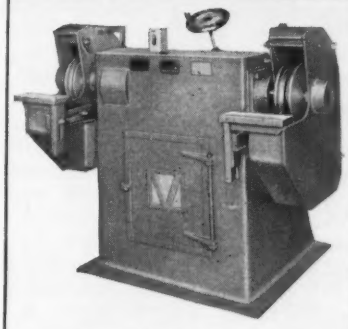
G and P "HD"



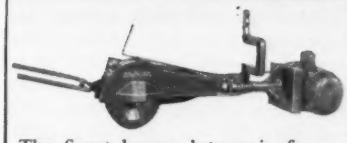
Here's a heavy duty swingframe BELT grinder to do those tough, difficult jobs quickly and easily. Wide choice of horse power, belt dimensions and SFPM. Adaptable to special applications combined with other machines. Write for interesting Bulletin No. 110.

MARSCHKE



The undisputed champion in any grinder division. Precision built to provide maximum wheel life and metal removal. A maintenance man's favorite for long, trouble-free service. Write for Bulletin No. 108.

MARSCHKE



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Grinding and Polishing Machinery Corp.
SUCCESSORS TO VONNEGUT MOULDER CORPORATION

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ordinance. It provides for an orderly procedure in terms of time for present equipment and installations to meet more stringent fixed future requirements.

Existing equipment must meet the standards set for new equipment within 5 to 10 years. This is to give enough time to owners of existing equipment to reach the standard required by the new code without undue hardship.

The new ordinance also establishes standards for emission of dust and other solid matters. Because there is a great deal of information yet to be gathered on air pollution produced by substances other than coal, however, the basic limitation is restricted principally in application to boilers burning coal. The other standards to be provided will be set forth in a code of recommended practices.

Limitations for emission of smoke and particulate matter are set forth for cupolas, air furnaces, and heating and reheating furnaces. Experts have stated that foundries will be able to live with the proposed ordinance, but they also emphasize that considerable expenditures must be made to put existing equipment in compliance.

Some Chicago suburbs are formulating air pollution ordinances patterned after the Chicago proposal.

Atomic Anniversary

Just one year ago, this column noted that on Feb. 9, 1957, the first nuclear power system in the Western Hemisphere designed and built solely for experimentation in the generation of electric power was put into operation formally at Argonne National Laboratory at the Atomic Energy Commission at Lemont, Ill., near Chicago. Interest in the event was based on the fact that castings in wide ranges of size and metals were used conspicuously in the reactor and its steam power plant.

This Experimental Boiling Water Reactor (EBWR) has completed one year of operation and has yielded valuable data. It has operated at 60 per cent of its total capacity and logged without incident more than 11.6 million kilowatt-hours of electricity. It is being studied by experts from Chicago's Commonwealth Edison Co. who will be charged with operating that firm's Dresden nuclear power plant, now under construction.

The primary goal in operating EBWR, it is pointed out, is to get information—not kilowatts. The plant produces 5000 kw of electricity, which supplies most of the

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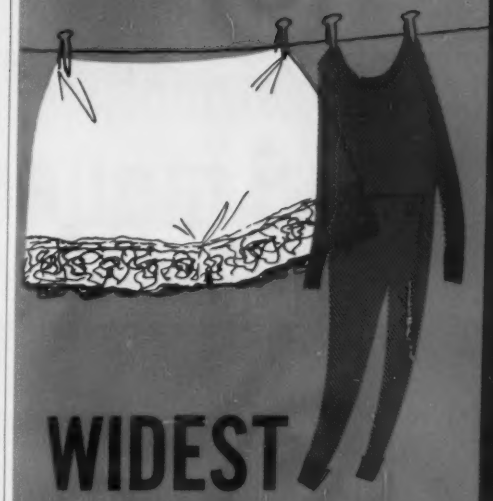

WIDEST APPLICATION

Whatever your cleaning job may be, there is a size and type of Malleabrasive shot or grit of a specialized hardness to do your job best.

Whether you use centrifugal or air-blast cleaning equipment—whether you want shot finish or grit finish— whether you clean steel, gray iron, malleable, bronze or aluminum, whether for cleaning before surface coating, enameling, metallizing, galvanizing, you can have in Malleabrasive the right type to do it best.

The full and complete Malleabrasive process—used by us exclusively—enables us to combine the toughness of malleable iron with various degrees of hardness to produce abrasive "tailored" to your special needs.

Our service personnel is available to consult with you without obligation. Write us.

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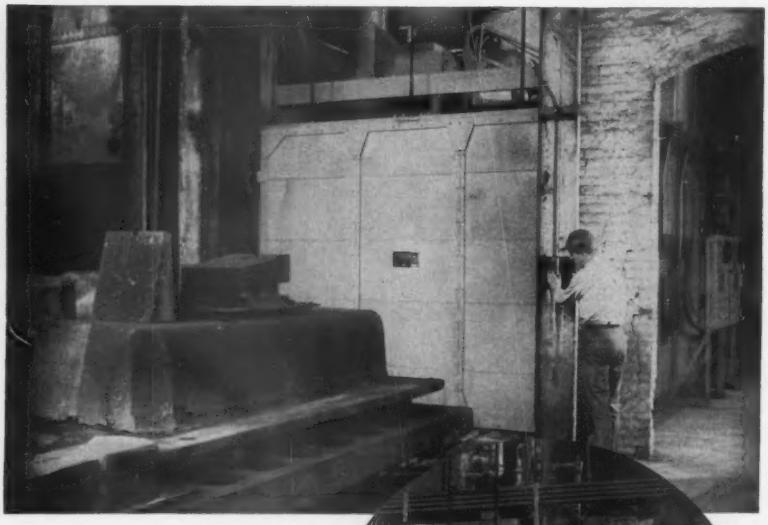
Cutting Costs for its Owner



CAR TYPE CORE AND MOLD OVEN

Above—A difficult engineering and installation problem solved by Carl Mayer because the oven filled this space completely. This modern oven, with patented down draft heating system and motor operated lift door, replaced an obsolete brick oven.

RACK TYPE CORE OVEN

Right—Installed at rear of mold oven to form an efficient, flexible combination. Miscellaneous cores are uniformly baked with modern, automatic controls. Operation is efficient and economical.

Carl Mayer's outstanding engineering and design features sold the steel mill where these ovens are now in operation. They incorporate the exclusive Carl Mayer recirculating heating system and special triple slotted panel construction.

Heat loss is reduced up to 1/3, and fuel savings up to 50% over old conventional methods are possible. Temperature uniformity is guaranteed.

Consult Carl Mayer now for any type foundry oven or furnace, large or small, and for any purpose. Write for Bulletin 53-CM.

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laboratory's daily power needs. The operating power level recently was more than doubled from the design level of 20,000 kw (heat) to 50,000 kw.

Philadelphia— Casting demand still lags. Foundrymen are hopeful of an upturn this spring, but so far this year business has been sluggish and at the moment there is little, if any, improvement in inquiry.

Gray iron casting operations are estimated at about 50 per cent of normal capacity, with few shops working more than four days a week and a number operating at less. Backlogs average less than two weeks. Steel foundries continue at a little better rate than other foundries—about 65-70 per cent with four-week backlogs. Bolstering steel casting demand in particular are specifications for ship propulsion machinery and heavy electrical equipment.

Malleable operations are fair, although backlogs are small. Demand for small precision castings is fairly good, but there is a continued lag in pipe fittings, hardware, and railroad needs. A likely improvement in building construction this spring may lead to some gain in pipe fittings and hardware. An increase in building construction and road work may also give some lift to specialty shops in the gray iron field.

While business is far from active, the brass and bronze people are somewhat more cheerful. Job shops still average about three or four days a week but heavy electrical equipment requirements are holding up well, plumbing supplies are a little more active and there is a slight improvement in inquiry for industrial pumps and valves. Also, ship requirements are fairly well sustained, affecting captive shops principally, and meter demand has picked up a bit. Most meter work is handled by captive shops, and while volume has stepped up it will likely be some time before there will be an overflow to the job shops. Actually, some of the meter shops are still operating at no more than 50 per cent of normal.

Raw materials are in ample supply. Mystic iron is being barged from Everett, Mass., for marketing in the Philadelphia district by Debevoise-Anderson Co. Inc., which until the first of the year had been handling Swedeland iron. It is being stocked at the plant of the Philadelphia Coke Co., which along with Mystic is one of the affiliates of Eastern Gas & Fuel Associates. The iron is being priced to meet district competition.

SHELL MOLDERS:
More stable pattern sprays with
DOW CORNING 8 EMULSION
(SILICONE PARTING AGENT)

Even after long storage, Dow Corning 8 Emulsion parting agent still stays uniformly dispersed and ready for dilution when you need it.

This inherent resistance to separation and creaming will save you time and money . . . simplifies preparation of parting agent sprays. Many experienced shell molders premix several days' supply; gentle agitation keeps the silicone solution always ready for their instant use.

You can reduce production time to an absolute minimum and assure cleaner, easier release with water-dilutable Dow Corning 8 silicone emulsion.

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• quick, easy release • easy to apply — faster wetting action • economical in extremely low concentrations • resists creaming or separation • minimum build-up — closer tolerance shells • stepped-up production — maximum number of shells between pattern cleanings • nonflammable • fast delivery from centrally located warehouses.

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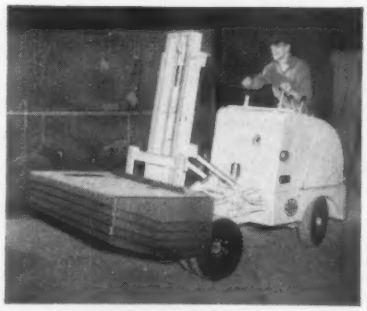
NEW! Multiple-tool R-18 Moto-Bug®

capacity: 3000 lbs.

Here is a new concept in material-handling methods that obsoletes expensive, single-purpose equipment. Kwik-Mix® Moto-Bug lets you haul, lift, stack, load, unload with *one* low-cost basic unit and easily-changed attachments. For example, check the new R-18 Moto-Bug, introduced here. As an 18-cu. ft. power wheelbarrow, or 42x54-in. flatbed truck, it hauls 3000 lbs., climbs 25% ramps fully loaded. As a tractor, it has 780 lbs. drawbar pull for towing wagons, carts — and 5-foot scraper blade for light clean-up, snow removal, etc. As a 7-foot fork lift, it handles 1500 lbs. at 15-in. load center.

This big-capacity, 4-wheel R-18 is maneuverable, light — travels at speeds up to 12 m.p.h. forward and reverse. There's direct drive to automatic power-flow transmission — *no clutching, no shifting.* It's powered by a 9.2 h.p. air-cooled gas engine — exhaust fume-control unit, or L.P. gas equipment optional. See Kwik-Mix distributor for a demonstration, or write us *today.*

Change R-18 Moto-Bug from hopper body to platform, and you have a heavy-duty 1½-ton truck. Towing hitch or 5-foot blade converts it to a light all-purpose tractor.



7-foot fork lift is easily attached to the R-18 Moto-Bug. Forks are adjustable 6 to 32 in. wide. Power tilts the mast 2° forward, 10° back for load pick-up, release.

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Send us literature on R-18 Moto-Bug with: ☐ hopper ☐ platform ☐ fork lift

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☐ *Also interested in smaller S-10 Moto-Bug with multiple attachments.*

Obituary

HARLOW ADAMS, 62, president, the Adams Co., manufacturer of molding machines and flask equipment, Dubuque, Iowa, died at his home there Jan. 29. Mr. Adams, a native of Hinsdale, Ill., joined the company in 1919 after he was graduated from Northwestern University.

Arthur H. Jameson, until his retirement in 1949 secretary and manager of castings sales, Malleable Iron Fittings Co., Branford, Conn., died Feb. 3. He was educated at Harvard University and Massachusetts Institute of Technology. Mr. Jameson was active in committee work of various technical organizations. A former vice president of Steel Founders Society of America, he was made an honorary member of that organization in 1949.

George P. Madison, 82, identified with the foundry industry for 50 years, died Jan. 20 in Cleveland Heights, Ohio. A native of Denmark, he came to the United States in 1891 and was engaged in the foundry industry in New York for several years. He went to Cleveland in 1933 and perfected a patented plaster casting process, used particularly for aluminum. Mr. Madison retired from Plaster Process Castings Co., there, in 1945.

Wesley S. Leaper, 57, Cleveland district sales manager, Linde Co. Div., Union Carbide Corp., New York, for the last 20 years, died Jan. 30. Graduated from the University of Wisconsin, he played professional football with the Green Bay Packers for several years and joined the former Linde Air Products Corp. as a salesman in 1927.

John B. Jacob, 74, co-owner and operator of the former F. M. Jacob foundry, Columbus, Miss., died Jan. 28. The foundry was founded by Mr. Jacob's father and had been one of the oldest in the state.

Otto H. Hofman, 70, vice president-secretary, General Magnetic Corp., Detroit, died Jan. 27. Mr. Hofman moved to Detroit 18 years ago from Chicago.

Dr. Willis R. Whitney, 89, an honorary vice president, General Electric Co., and founder of General Electric Research Laboratory, Schenectady, N. Y., died Jan. 9. He

joined the company in 1900 and for 32 years directed the laboratory. Since retiring from that post in 1932 and from the vice presidency in 1941, Dr. Whitney had continued research as honorary vice president and consultant to the laboratory.

Leo N. Newman, executive vice president-general manager, Josam Mfg. Co., Michigan City, Ind., died Jan. 13 in Chicago. Mr. Newman was graduated from Western Reserve University in 1921.

George L. Ebert, 68, former assistant general foreman, American Steel Foundries, East St. Louis, Ill., died Jan. 24. Mr. Ebert had worked for the company 49 years when he retired in 1954.

Porter F. Colwell, 59, coreroom foreman, Buffalo Forge Co., Buffalo, died Jan. 16. Mr. Colwell had worked for the company 42 years.

Third Foundry Instructors Seminar Planned by AFS

Third annual Foundry Instructors Seminar of the American Foundrymen's Society will be held at Case Institute of Technology, Cleveland, June 19-21. The seminar is being planned to provide instructors in foundry and patternmaking at high schools and vocational schools with an intensive teaching course that will enable them to keep abreast of the latest innovation in foundry and patternmaking techniques and applications, according to Ralph E. Betterley, education and training director of American Foundrymen's Society.

The meeting will be highlighted by field trips, operating work shops, and study of the new AFS Training and Research Institute program. Instructors are expected to attend from schools throughout the United States and Canada.

National Health Conference Meets in Atlantic City

How to keep workers healthy and on the job will be the subject of a national industrial health conference to be held in Atlantic City, N. J., April 19-25. An annual meeting, the conference brings together specialists to discuss recent developments, problems, and progress in worker health. Included in the participating organizations are representatives of industrial management, labor, and others concerned with health in industry.

No air pollution code . . . no in-plant dust or fume control problem too tough for Wheelabrator Collectors

99+% Collection Efficiency Proven in 38 Electric Furnace Installations

Meeting the requirements of stringent air pollution codes is no easy job when you're dealing with such a troublesome and variable a problem as electric furnace fume. The one collector with a record of approval all over the country is the Wheelabrator Dustube cloth-tube type collector. Twenty-six prominent plants are now ventilating 38 furnaces with Wheelabrator collectors. Efficiencies of 99% and higher are being achieved. Thus Wheelabrator Corporation has the background and experience to access the variables and economically solve your specific furnace control problem.

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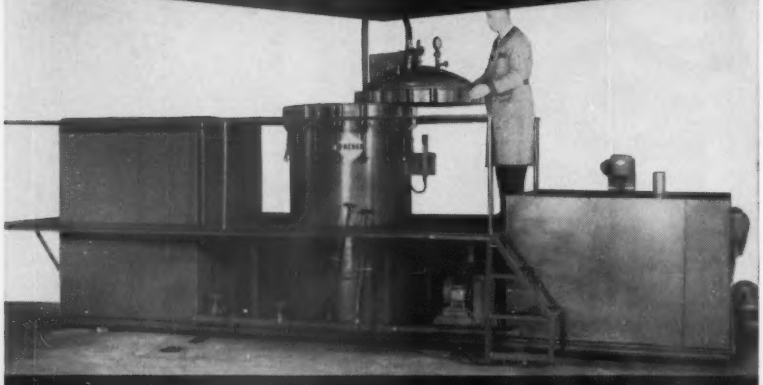

To Impregnate Castings Like These

for a Fraction of a Penny per Pound

Solve all porosity problems in ferrous and non-ferrous castings with *leased* Prenco Impregnation Equipment operating right in your plant. No capital expenditure is necessary. Total cost to you can be as little as a small fraction of a penny per pound of castings treated.

Prenco Equipment, using fast-acting, deep-penetrating Porlox Seal, is production proved . . . widely used by major foundries and die casting plants. Superior results are achieved even with castings of microscopic porosity.

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Steel Founders' Society Sets Dates for Annual Meeting

The 1958 annual meeting of the Steel Founders' Society of America will be held at the Drake Hotel, Chicago, March 17 and 18, 1958.

The meeting will be opened by a message from Howard F. Park Jr. Treasurer R. G. Parks will report on the society's financial picture, and staff members of the society will present talks on current problems in the industry.

The March 17 session will feature an address by Sen. Karl E. Mundt (R., S.D.). Senator Mundt, a member of the Senate Appropriations Committee, the Committee on Government Operations, and the McClellan Committee investigating labor, will discuss "What Lies Ahead in Labor Legislation."

On March 18, Fred Smith, management consultant, Fred Smith & Associates, Cincinnati, will address the meeting on "How to Quarterback the Team." Mr. Smith is a former vice president of Gruen Watch Co. Carleton Tibbetts, president, Los Angeles Steel Casting Co., Los Angeles, will discuss what is the most serious labor problem from the steel foundrymen's point of view.

J. B. Thomas, president, Texas Electric Service Co., Fort Worth, Tex., who is a registered engineer, chairman of the Texas Research League, and vice president and director of the Texas Atomic Energy Research Foundation, will discuss "Power Development."

The luncheon speaker will be Dr. William H. Alexander, well known churchman from Oklahoma City, Okla., onetime candidate for U. S. senator in Oklahoma, and chaplain of the Republican Party in 1952.

Publishes Safety and Good Housekeeping Pamphlets

Pointing out that most workers know their jobs, have experience, and do not want to hurt others or themselves, "We Know Better," has been published by the National Safety Council, 425 North Michigan Ave., Chicago 11, Ill. Another pamphlet, "Your Future—Keep It Clean," concentrates on housekeeping in the plant, noting that good housekeeping makes work easier, smoother, quicker, and safer. Single copies of the pamphlets are available free on request. Information on quantity prices may be obtained from the National Safety Council.

Raw Materials Handling In Medium Size Foundry

Tramrail Crane Handles 80 to 90 Tons Per Day

ALL materials required for the charging of cupolas in the Heavy Foundry of Standard Foundry Company, Worcester, Mass., are handled by a 3-ton, 3-runway, 64'-0" long cab-operated Cleveland Tramrail crane with a 36 inch magnet. From 40 to 45 tons are put in the large storage bins per day. The same crane delivers the materials from the storage bins to the hoppers in the charge accumulation area.

The crane is part of a more extensive Cleveland Tramrail system, all of which has been in service for 12 years. The crane is busy 12 hours a day and operates on a 130'-0" long runway at 300 f.p.m. Hoist speed is 50 f.p.m.

Standard Foundry produces meehanite castings which range in sizes up to 10 tons and are used mostly for machine tools of the fine machine-tool builders in the vicinity.

Incoming raw materials are taken to the large storage bins in the foreground by the Cleveland Tramrail magnet-handling crane. The same crane fills a series of hoppers, seen in the rear, in the charge-gathering area.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

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Fig. 1—A plaster mold made from original pattern is first step in making a Plastic Steel duplicate

Fig. 2—The plaster mold either is painted with a sealing lacquer or dried in an oven as shown above

How To Make
PLASTIC STEEL PATTERNS

By DONALD J. VOLK and GEORGE BATTIS
Alloy Steel Casting Co.
Southampton, Pa.

ALLOY Steel Casting Co., like many other foundries, has had need for a simple, quick, economical method of producing dimensionally accurate duplicate patterns. We have filled that need by using Plastic Steel, a product developed originally for making jigs, fixtures, dies, and for plumbing repair work. It is made by Devcon Corp., Danvers, Mass.

Fig. 3—Lightener cores of wood are suspended in cavity of plaster mold and remain in the duplicate pattern

The surface of a cast Plastic Steel pattern has a finish of approximately 32 microinches. Since shrinkage is small, there is little practical difference in size between the original pattern and the duplicate. Abrasion resistance of the material is good. Matchplates used in our iron and brass foundries have produced as many as 6000 castings to date and exhibit no noticeable wear.

The physical properties of Plastic Steel are: Tensile strength, 10,000 psi; compressive strength, 18,000 psi; flexural strength, 13,000 psi; volume per pound, 11.4 cu in.; shrinkage on a 3 x 4 x 1-in. specimen, 0.0005 in. per in. The material also has shown that it has good machinability.

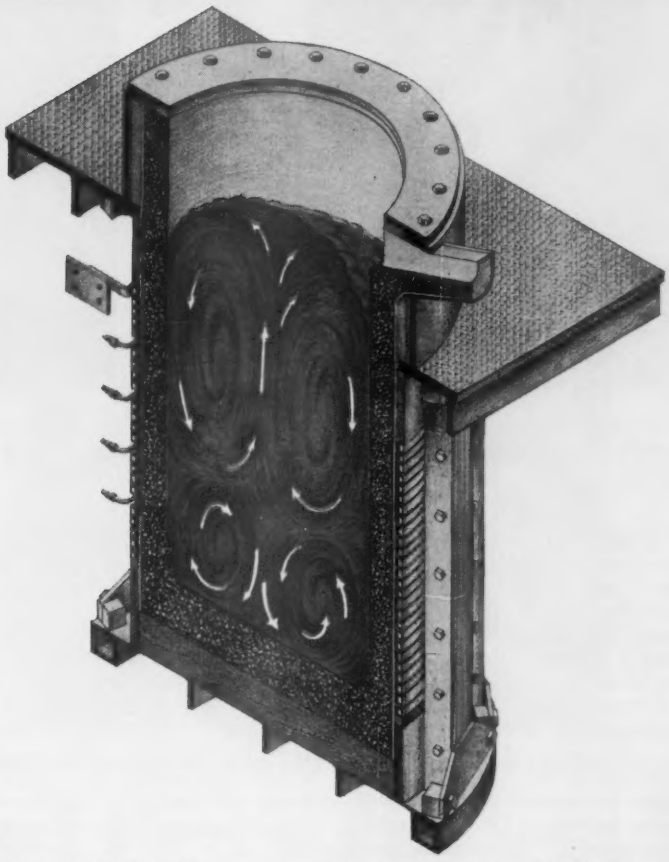
How to Make Duplicates — A wood or metal loose pattern half is laid on a board and a wood frame placed around the pattern and clamped to the board. Surfaces of the pattern, board, and inside of the frame are coated with a plaster release agent. A mixture of high-grade pattern plaster and water then is poured slowly around the entire pattern. After the plaster sets up at room temperature, the pattern is removed as shown in Fig. 1. Next, the plaster mold is coated with a heat-resistant sealing lacquer. Sometimes we eliminate the need for a coating by placing the mold in an oven at 140° F for 2 to 3 hr as shown in Fig. 2. This eliminates entrapment of moisture on the mold surface. Because the plastic metal cures itself by chemical generation of heat, moisture present on the mold may expand and cause imperfections on the pattern surface. After sealing or drying, the mold is coated with paste wax.

Proper preparation of the plastic material for pouring into the mold is essential. The proportions of Plastic Steel and the special thinner and hardener supplied by the manufacturer are critical; mixing instructions should be followed closely. The materials may be mixed by hand or with a slow-speed (about 100 rpm) electric mixer.

We strive to lighten these duplicate patterns by using wood cores,

AJAX-JUNKER

a new principle in 60 Cycle induction melting



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- A cylindrical induction coil supplied with ordinary 60 cycle current induces heat and vigorous electromagnetic stirring in the molten metal charge.

Integrated electric controls regulate power, maintain high power factor automatically.

Monolithic refractory linings are made by ramming against the sturdy water-cooled coil held in a rigid frame of magnetic and structural steel.

This new principle was perfected in Europe over the last seven years. Over 100 Junker furnaces are now in use. AJAX-JUNKER designs are based on latest experience, using American components and practices throughout.

WHAT IT CAN DO:

- Outstanding results are proven in these fields:

  DUCTILE and ALLOY IRON CASTINGS
  RECOVERY OF IRON TURNINGS
  RECOVERY OF ALUMINUM SCRAP

Available sizes range from 1 to 10 tons, with normal melting cycles from 2 to 4 hours. Power ratings are 200 kw through 1500 kw.

May We Explore the Possibilities of this New Method with You?

AJAX USA

60 CYCLE INDUCTION MELTING

ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

Associated Companies: Ajax Electrothermic Corporation Ajax Electric Company

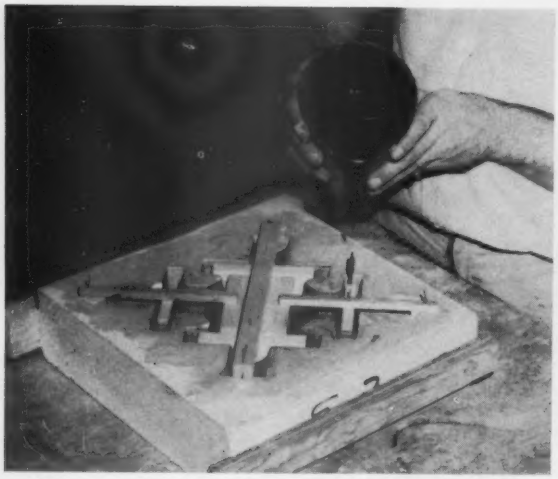

Fig. 4—Plastic metal is poured slowly into the cavity around the core to avoid entrapping air

Fig. 5—Finished halves of a duplicate loose pattern are shown above with lightener core in place

Fig. 3, which are suspended in the plaster mold cavity and become an integral part of the pattern. Cores of modeling clay or plaster also may be used, but they will be removed, leaving a hollow pattern.

Fig. 4 shows a plaster mold with wood lightener core in place. The plastic material should be poured slowly into the mold cavity to avoid entrapment of air. If the mold is complex we put it in a vacuum chamber to remove air which might be entripped. Vibrating the mold during pouring also helps to eliminate entrapped air and obtain a sound pattern.

Average hardening time for the plastic material is 2 to 3 hr at room temperature, depending on the volume poured. The greater the volume, the quicker the cure. Before removal from the plaster mold, the plastic pattern is machine-planed level with the surface of the mold.

The second half of the pattern is produced exactly as the first and equipped with dowel pins and holes, Fig. 5. With careful handling the plaster mold may be used many times to reproduce the pattern. If Plastic Steel is used in place of plaster for the mold, hundreds of duplicate patterns can be made.

Procedure for Matchplates — Matchplates are made by cutting out the pattern outline in a plate or board, aligning the cope and drag plaster molds on each side of the cutout, and clamping them in place. Plastic metal is poured into the cavities through a simple riser and gating system. The adhesive quality of the plastic metal holds the pattern in place regardless of whether the mounting is on a wood or metal plate. Desired changes in the pattern may be made beforehand by altering the plaster molds with modeling clay.

We also have produced Plastic Steel coreboxes as well as molds in which a variety of gating system parts of the same material have been produced. The gating system patterns have proved useful to molders doing loose pattern work. Also they wear well under rough handling. This equipment is illustrated in Fig. 6.

Equipment made with the plastic metal can be repaired by applying the same material in a putty-like consistency to the damaged area. After the repaired section has hardened it may be machined to the desired contour.

It has been our experience that making patterns, coreboxes, and other equipment as described above takes about half the time required to make wood patterns. The plastic metal patterns are dimensionally accurate and withstand rough handling and abrasive wear. Because they are unaffected by humidity and temperature from sub zero to 250° F they do not present a storage problem.

Editor's Note: This article is based on a paper originally presented by Mr. Volk at the Steel Founders' Society's technical and operating conference in Cleveland, Nov. 11-13.

Fig. 6—Illustrated here are examples of plastic metal coreboxes and molds in which gating system parts of the same material are produced

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Photograph courtesy of Whiting Corporation

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..to meet your specific requirements for maximum service

A. P. Green has a complete line of high quality refractories for every zone of cupola service. For top efficiency and economy tailored to your particular cupola requirements — A. P. Green manufactures cupola blocks, firebrick, fire clay, high temperature bonding mortars, plastic refractories (super duty, high alumina and graphite-type), breast brick, slag-hole blocks, high strength castable refractories, and special siliceous mixes for gun application or for ramming.

When your A. P. Green representative recommends a particular type of lining, you're sure of the finest refractories modern research can develop . . . specifically designed to give you maximum service at lowest cost.

For specific recommendations, contact your local A. P. Green distributor . . . he's listed in the yellow pages of your telephone directory . . . or write

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For basic cupolas, requiring large amounts of fluorspar, SUPERFLUX-D is the answer.

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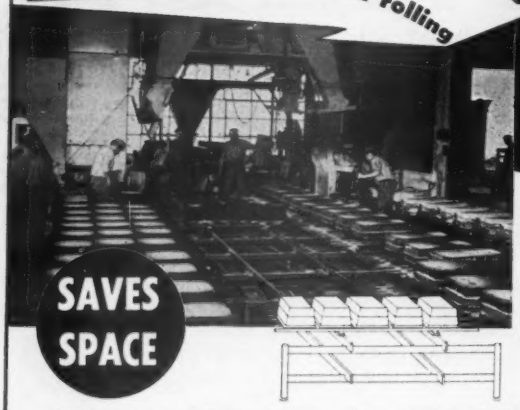
NOMAD keeps them rolling



NO MORE RUNNING OUT and LAYING DOWN MOLDS

SAVES SPACE

- INCREASES PRODUCTION
- REDUCES SCRAP
- REDUCES MANPOWER

This "2 in 1" Conveyor gives EXPANSION and modernization without requiring new building facilities! Molds, set on roller-equipped pallets, "roll away" on the top track for storage and pouring. Empty pallets are returned and stored on the bottom track until needed. Pallets handle a wide range of mold sizes.

If space is at a premium in your foundry, write TODAY!

NOMAD FOUNDRY EQUIPMENT

WESTOVER CORPORATION
NOMAD EQUIPMENT DIVISION
3110 W. FOND DU LAC AVE. • MILWAUKEE 10, WIS.

Circle 679 on Page 51

Points Out Advantages of Product Development

A circular designed to point up the need for anticipating and meeting changing market wants and needs has been published by the Small Business Administration. Entitled "Reducing the Risks in Product Development," it is No. 82 in the series of Management Aids for Small Manufacturers. Product development is an inevitable part of a company's attempt to maintain sales, profits, and market position.

When it is recognized that change is continuous, the next steps are to understand it, to keep alert regarding product development, and to establish procedures which will reduce the possibilities of failures or losses. Old products go out of use and new ones are developed.

The circular describes sources of ideas for changes, preliminary evaluation, major risk factors, techniques for reducing marketing risks, etc. Copies are available free from the Government Printing Office, Washington 25.

Conference Covers Spheroidal Graphite Applications

At a one-day technical conference of the British Producers of Spheroidal Graphite (nodular) Iron, held Oct. 23 in London, technical papers covering all aspects of melting, metal treatment, foundry production methods, and casting applications were discussed. The conference was organized by the technical committee of the association. W. R. Cooper, chairman of the association. presided at the conference, organized by the technical committee. It was attended by

"We use a cutter here, Alex, not a seven iron!"

ANOTHER INDUCTO INSTALLATION...

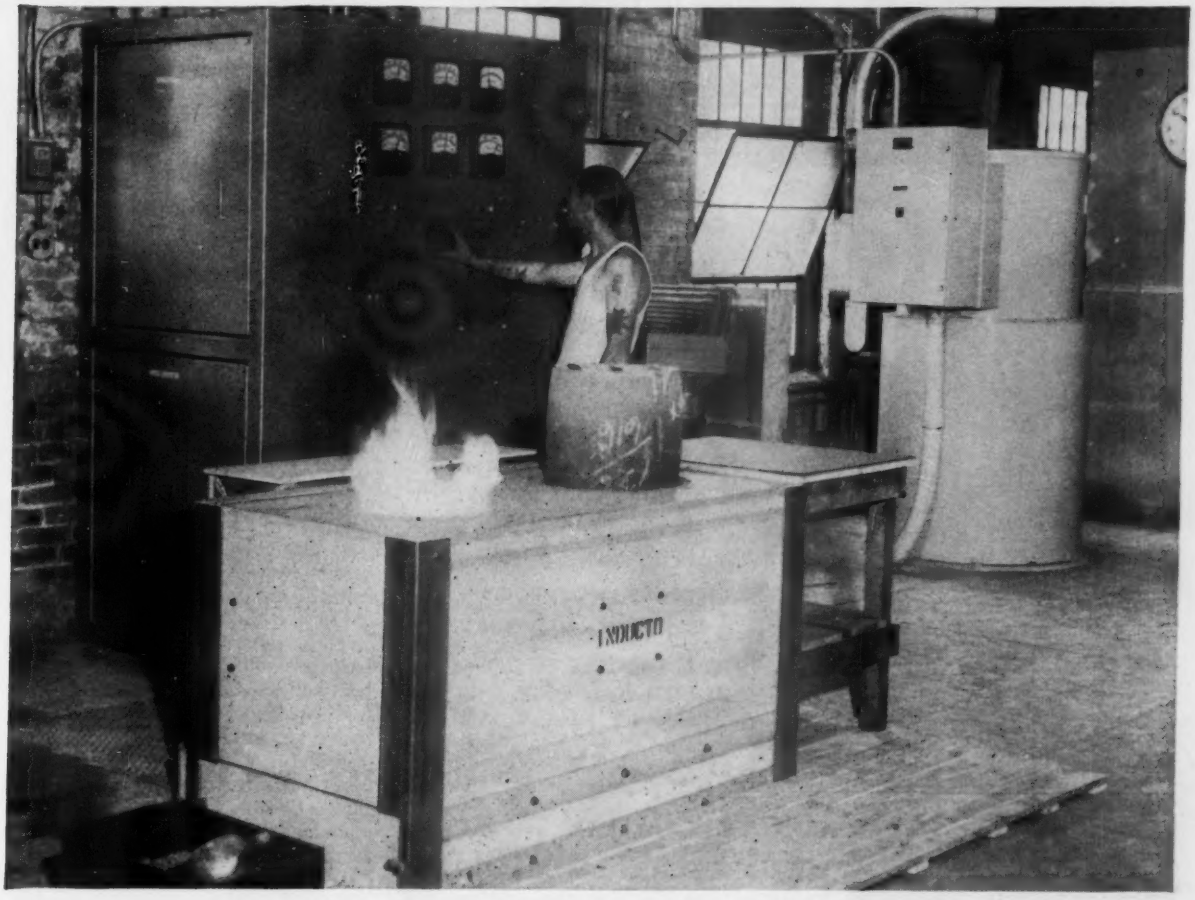


PHOTO COURTESY OF BUSHINGS, INC., PHILA. 32, PA.

The Foundry and the Feather Duster

Shortly after Bushings Incorporated, a Philadelphia manufacturer of cast bronze bushings and bearings, replaced four oil-fired furnaces with an INDUCTO Push-Out induction furnace, the management received a strange request . . . the foundrymen wanted a feather duster. They liked the INDUCTO furnace and control so much, and were so pleased with the cooler and cleaner foundry, that they wanted a feather duster to keep the equipment clean.

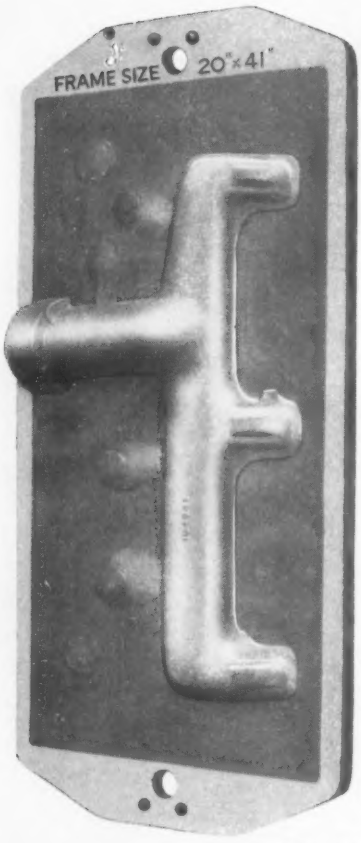
And the management was pleased too! For in addition to happier and more productive employees, they gained other benefits. The higher melting speeds and precision control of the INDUCTO Push-Out furnace helped reduce metal losses. In addition, it became possible to reclaim metal from melts and machining. Production time was saved in the handling of crucibles and the transferring of melts. In fact, the one INDUCTO Push-Out furnace provided as many melts in six hours as the four oil-fired furnaces did in eight.

Why not learn for yourself how INDUCTO furnaces and precision control can help modernize your foundry and save production dollars? Write today for more complete details.

INDUCTOTHERM corporation

412 Illinois Ave. Delanco, N. J.

Circle 680 on Page 51



"The type of work we produce in TAMASTONE we would be unable to make at all in the absence of skilled help"

COLUMBUS BRASS
& ALUMINUM CO., INC.
Columbus, Indiana

This Drier pattern for a diesel intake manifold is made from an original master pattern. *Only one skrinkage!* Pattern was used for 500 pieces. Only 3½ hours labor and 50 pounds of TAMASTONE were required. Up to 1,000 castings have been made from a plate of this type!

No special skill needed to increase production 400% or more! . . . WRITE . . .

TAMMS INDUSTRIES CO.
228 N. LaSalle Street
Chicago 1, Illinois

Circle 681 on Page 51

CONCRETE MIXER MAKER FINDS ARCAIR CUTS COSTS

Finishing operations on rugged, cast "Ni-Hard" blades for batch concrete mixers was slow and costly for the Besser Co. of Alpena, Michigan—builders of concrete block-making machinery.

But the fast, versatile Arcair process solved the problem of removing riser stubs efficiently. Now in 15-20 minutes per stub, the Arcair torch does a job that once took 2 hours of tedious grinding. Savings in time amount to more than 85%, and consumption of grinding wheels has been cut by 75%.

Arcair can help you too! Basic simplicity—electric arc plus ordinary compressed air — makes the patented Arcair torch, with Arcair Copperclad electrodes, the new, efficient, cost-cutting answer to most metal removing problems.

See proof of performance from many industries. WRITE TODAY for FREE BROCHURE!

Arcair Metal Removal Torches

465 S. Mt. Pleasant St., Lancaster, Ohio

Circle 682 on Page 51

nearly 100 delegates, including technicians, production executives, and management.

The association plans to maintain close technical liaison between members on common technical problems through regular meetings of technicians at similar conferences and the operation of an active technical committee which can maintain liaison with Mond Nickel Co. Ltd. and the British Cast Iron Research Association.

High Morale of Employees Means Higher Production

Employees with high morale produce more than other employees, according to the Personnel Policies Forum of the Bureau of National Affairs Inc., Washington. The Forum is a panel of some 200 personnel and industrial relations executives assembled by the BNA. Members represent all types of industry from all sections of the country.

Despite the importance of wage levels in determining an employee's feelings about his job, Forum members believe that such nonwage factors as opportunity for advancement, recognition of achievements, and status within the company are even more important to some employee groups. These include management, professional, and technical employees.

Almost all members agree that how well a foreman does his job has a great effect on the morale of employees under him. They recommend that foremen and supervisors be trained to handle people—preferably on a continuing basis.

Metal Creep To Be Studied Under Foundation Grant

Effect of imperfections in metals on their creep tendency at elevated temperatures will be studied at the Northwestern University Technological Institute, Evanston, Ill. The school has received a $25,400, 2-year grant for the work from the National Science Foundation. The work will be directed by John O. Brittain, associate professor.

Offers Small Business Aids

Small Marketers Aids No. 24, 25, and 27 are, respectively, "Small Business and the Federal Trade Commission," "Are You Kidding Yourself about Your Profits?" and "Public Relations for Small Business Owners." *Management Aids for*

Looking for an answer to the

ABRASIVE PROBLEM

Just dial NOrmandy 3-8529 in Ann Arbor, Michigan, and we will provide the answer. We have solved this problem and satisfied over 1000 new users last year with AMASTEEL. Here is an abrasive which is made in an electric arc furnace, it is a hypereutectoid steel, and fully heat-treated to a tempered martensitic microstructure. AMASTEEL is free from dirt and slag and other contaminations. It is screened to S.A.E. size specifications. AMASTEEL is predominately round and solid, and is manufactured under quality control. Remember, the answer to your abrasive problem is as close as your

NOrmandy 3-8529

ALLOY METAL ABRASIVE CO.

ORIGINATORS OF CAST STEEL SHOT

123 S. DIVISION ST., ANN ARBOR, MICHIGAN

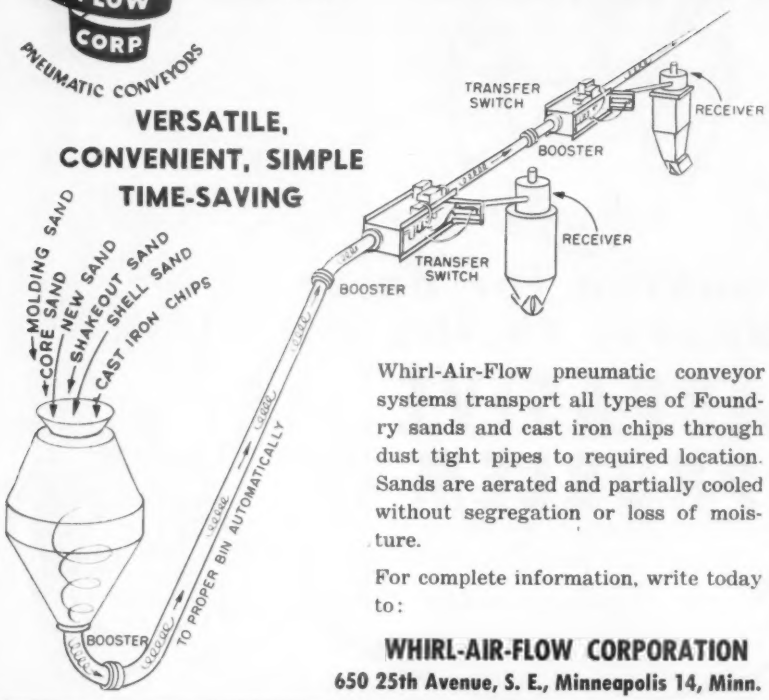
Branches in principal cities

Circle 683 on Page 51

WHIRL·AIR·FLOW CORP.
PNEUMATIC CONVEYORS

PIPELINE SYSTEMS

VERSATILE,
CONVENIENT, SIMPLE
TIME-SAVING

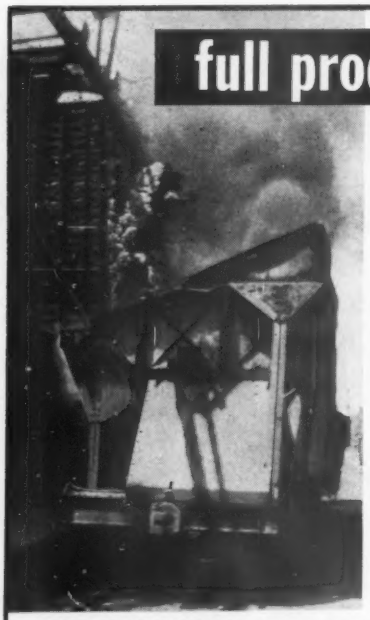


Whirl-Air-Flow pneumatic conveyor systems transport all types of Foundry sands and cast iron chips through dust tight pipes to required location. Sands are aerated and partially cooled without segregation or loss of moisture.

For complete information, write today to:

WHIRL-AIR-FLOW CORPORATION
650 25th Avenue, S. E., Minneapolis 14, Minn.

Circle 684 on Page 51



full production ahead

with newly relined ovens for

TERRE HAUTE SPECIAL FOUNDRY COKE

This top-rated foundry coke is now coming out of completely relined ovens—with their assurance of more decades of a sure supply.

Expect the high carbon, the low reactivity and ash you want. Cleanly sized over modern vibrating screens. Has ability to maintain optimum operating bed height in the cupola — and full melting efficiency. Ask for current analysis.

SOLD EXCLUSIVELY BY

REPUBLIC COAL & COKE CO.
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Manufactured by: INDIANA GAS & CHEMICAL CORP. Terre Haute, Indiana

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Small Manufacturers No. 87 is "Traps To Avoid in Small Business Management." All are published by the Small Business Administration, Washington 25, D. C. Copies are available free from SBA field offices or the Washington headquarters.

Plant Hygiene Problems To Be Discussed at Annual Meeting

Problems connected with air pollution, plant noise, and radiation will be discussed at the 19th annual meeting of the American Industrial Hygiene Association. Program of the meeting, to be held at Atlantic City, N. J., April 21-26, will include more than 100 technical papers. George D. Clayton, 14125 Provost, Detroit 27, Mich., is executive secretary of the association.

Book Review

FBI Register of British Manufacturers —1958. 30th edition, published by Kelly's Directories Ltd. and Iliffe & Sons Ltd., London, for the Federation of British Industries, cloth, 1138 pages, 7½ x 9½ in. Price 42s post free.

Products and services of over 7500 British firms under more than 5400 alphabetical headings are listed. In addition to the classified buyers' guide, the register gives addresses of companies and firms, and information about trade associations, brand and trade names, and trademarks. French, German, and Spanish glossaries provide translations for every product term used in the main buyers' guide. Each is numbered for easy reference between the English headings and their translations.

"I wish you'd stop walking off in the middle of a job!"

Eye Protection
482A
VINYLITE GOGGLE
Larger face mask — greater protected area
Deeper cup — increased lateral protection — easily fits over all safety glasses and personal glasses.
Modified nosepiece — aids comfort, facial fit.

It's AO's New "482A"!

(Vinylite Mask Goggle)

Once again American Optical engineering and research make a good product even better! This light, comfortable flexible mask goggle offers the trustworthy, *optically correct* protection which has made it so popular PLUS the new features above. It's a better buy than ever! Recommended for protection against flying particles striking from any direction in babbitting, chipping, cutting rivets, light grinding, on hand or machine tool work, or where spark-explosion hazards endanger. Your nearest AO Safety Products Representative can supply you.

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Lens — Interchangeable, one-piece acetate, easily removed and replaced. Curved slightly for increased field of vision. Provides greatest worker comfort, safety, efficiency.

Frame — Soft, face-hugging vinylite provides maximum flexibility and full protection.

Headband — Elastic, easily adjustable.

Color — Clear frame, clear or green lens. For green frame, clear or green lens specify Catalog No. 483A.

Always insist on the AO Trademark on Lenses and Frames

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SAFETY PRODUCTS DIVISION

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Circle 686 on Page '51

SAND AND FLOUR

- Domestic and Australian zircon foundry sands
- Zircon foundry flours in 200 and 400 mesh particle sizes
- Orefraction Zircon Sand and Flour meet S. F. S. A. specifications.

Orefraction
MINERALS INC.
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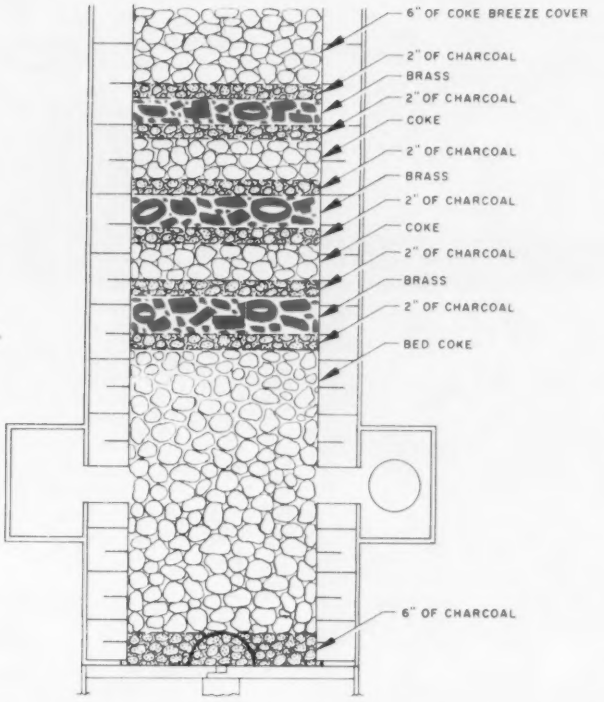
Trouble Shooting

By C. W. AMMEN



Drawing shows how to charge cupola to melt heat of brass. This practice should be used only to melt large heats, beyond common crucible capacity

Cupola Melting of Brass

Dear Charlie:

I have a small cupola and would like some dope on melting brasses. It is my understanding that one has to use a special, high carbon petroleum coke, or he can't make her go. I don't wish to use the cupola as a steady diet—only for the jobs above our crucible capacity. I have been told that it's foolish to use the cupola at all and that I would be far better off to buy some larger crucible furnaces or to lay off the big jobs. Well, win, lose, or draw, like most foundrymen I would like very much at least to give it a roll for its money.

Sincerely,
Sam

Dear Sam:

Even if it goes sour or blows up, you should give it a try, if only to satisfy your own mind. It is, as you no doubt know, not common practice due to high oxidation losses. Furthermore, because of the speed with which the cupola melts, you have to have a large operation requiring a lot of metal.

I have seen copper run down in a cupola, tapped into a hot receiver, and alloyed in the ladle with very nice results—also red brass with additions made to compensate for zinc and lead losses.

As you were told, the most practical system is to have a sufficient number or large enough conventional red metal melting units to do your job. If you intend to try the cupola, however—and my guess is that you do—don't have any qualms about it. Simply go at it carefully.

Incidentally, as we shall discuss, in place of high carbon petroleum coke, you can use charcoal.

Preparation of the cupola for melting red metals is one of the most important steps and should be done right and with care. Chip back the lining carefully, being sure to remove all the iron. This step is most important. Clean out the tuyeres so that there is no shot, iron, etc., which can be blown in when you start up the wind. Check around the spout, charging door, etc., for little pieces of iron.

When the cupola is completely free of iron, use your regular daub, and patch as you would for iron. Wash the lining with plumbago and molasses water from the bottom plate to 15 in. above the bed height. Pull up the bottom doors and dry very well overnight with a nailfree wood fire. Next morning, drop the doors, and give the warm lining another coat of blacking. Black up any cracks, etc., that you find.

You now are ready to start. Put up the doors, and make up the bottom as usual. Be sure the bottom sand is free of shot, iron, nails, and so on. Keep it a bit on the dry side. The kindling used to light the bed coke also should be free of iron, nails, or other metal. Cover the kindling with 6 in. of charcoal and use about 10 per cent less coke to make up the remainder of the bed than you would for iron. Of course, the bed is worked up as usual, part way at a time.

When the bed has burned through and is ready to go, put a 2-in. cover of charcoal on it. You now are ready to charge your metal. Charge the same weight of brass or copper that you would if you were melting iron, but use 10 per cent less coke between charges.

Place the first charge of metal on top of the charcoal covering the

bed coke. Cover the charge with 2 in. of charcoal, then 90 per cent of the coke you normally would use, then 2 in. of charcoal, another metal charge, 2 in. of charcoal, 90 per cent of the usual coke, and so on. Each charge of brass or copper should have a 2-in. cover of charcoal on each side of it. When all the charges are in, cover the last charge with 6 in. of coke breeze.

Use a light blast pressure. Start with about 8 oz and cut it back to about 5 oz halfway through the heat.

A small piece of soda ash in each metal charge is used as a flux—not much over 2 lb per charge. This figure is something you must determine for yourself.

Make sure your bull ladle or receiver is in good shape—ironfree, blacked, and hot—before you start the blast.

Metal loss will be about 60 per cent of the zinc and 15 per cent of the lead. Copper and tin losses will be minor.

Wire your receiving ladle with a copper wire to a known weight so that you can be sure of the weight tapped each time and can make the proper additions.

When you have tapped about half the amount of brass you intend to take in the ladle, add the preheated additions to compensate for loss. Be sure that the additions really are hot. Stir them in well, tap the remaining metal, and stir again. The tapping temperature should be about 2300° F. Deoxidize with phosphor copper. Test for gassy metal with a 2-in. test cock. If the top stays level or puffs up instead of piping or shrinking down, hold back the horses. Give the metal a shot of one of the several degasifying agents on the market, and make another test. Pour when the metal is ready and at the proper temperature for the casting involved.

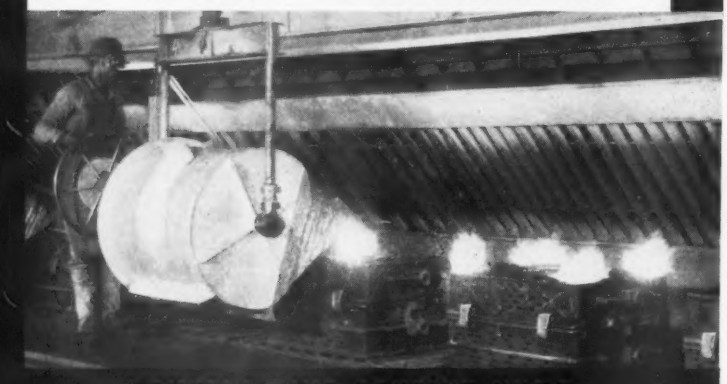
It is a good policy in red metals to oven or skin dry any job which will weigh 300 lb or over.

I trust this is the information you are looking for, old man. Be doggoned sure you have everything ready to go before putting on the wind. Red metals melt like ice cream in a cupola.

Sincerely,
Charlie

SCHNEIBLE

A HOOD THAT'S A FRIEND OF EVERY FOUNDRYMAN



COMPENSATING POURING HOOD

Clean, fresh air summer and winter, is what you enjoy with a Schneible Compensating Air Hood.

This hood includes air direction controls which allows efficient dust and fume collection without sacrifice of worker comfort.

Many sizes and capacities are available for both jobbing and production foundries.

Our representative will be glad to discuss your problem with you, or wire direct for complete details.

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SERVING FOUNDRYMEN THE WORLD OVER

Refer to Sweet's File No. 1e/5c

Nominations Are Opened for Doehler Diecasting Award

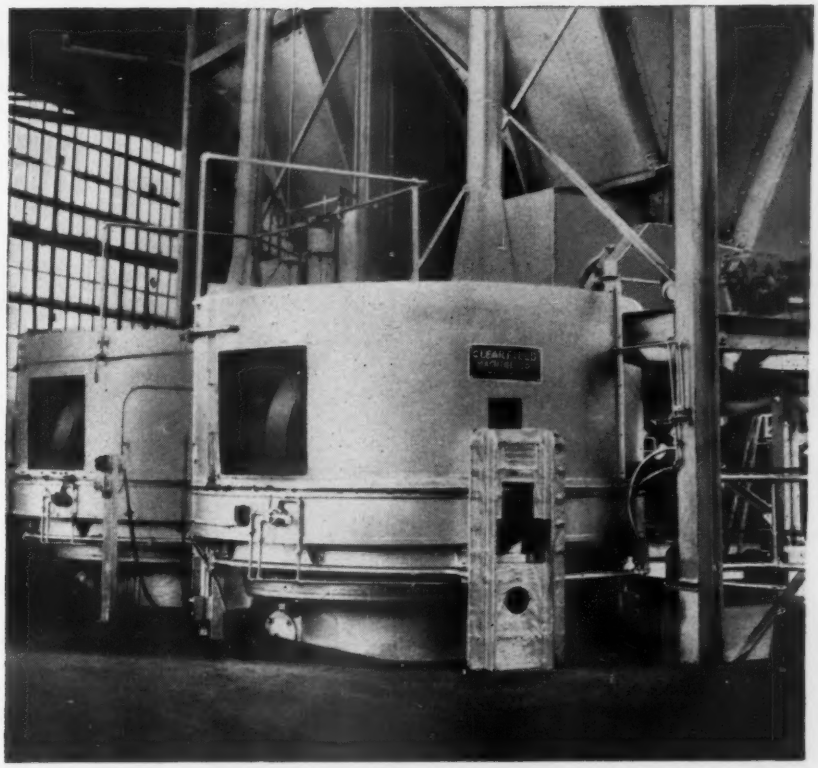
Nominations are open for the 1958 Doehler Award which recognizes outstanding contributions to the advancement of diecasting. The award, a plaque and cash honorarium of at least $500, is made annually by the American Die Casting Institute, national association of custom die casters.

Three considerations govern the award committee in selection of the recipient: 1. Technical achievement —as measured by scientific contributions of a metallurgical or engineering nature. 2. Advancements in plant operations—of a management or an administrative nature and related to the operational phases of the industry. 3. Other activities—not primarily of a scientific or operational nature but which enhance the reputation and acceptability of diecastings.

To be eligible for consideration, an achievement must be applicable generally to the industry. Nominations for the award, along with supporting papers or other related material, should be submitted before April 15 to the Award Committee, American Die Casting Institute, 366 Madison Ave., New York 17, N. Y.

the

Clearfield Mixer



is engineered, designed and built to *prepare sand properly*

Write today for Catalog No. 83. Get complete details on the tested efficiency of Clearfield Mixers.

Properly prepared sand for best foundry results doesn't just happen. It's the natural result of using correct equipment and a matter of precision in controlling all factors involved. Clearfield Mixers always give you properly prepared sand, and there is a Clearfield for every requirement.

***CLEARFIELD MIXER** mixes, tempers, aerates*

CLEARFIELD MACHINE COMPANY

Clearfield, Pennsylvania, U. S. A.

Circle 689 on Page 51

Let us demonstrate — right in your plant or shop — how 'Budgit' Hoists can make your lifting problems disappear.

Free Demonstration

IN YOUR PLANT OR SHOP

Make us prove how 'Budgit' Hoist can solve YOUR lifting problem

Your local 'Budgit' Electric Hoist distributor now makes you this special offer:

You pick the spot where you need help in lifting.

Call your 'Budgit' Hoist distributor. (You'll find him listed in the yellow pages under 'Budgit'.)

He'll bring a 'Budgit' Hoist to the spot you name, hang it up, plug it in, and show you how 'Budgit' can make your lifting job fast, safe and effortless.

No obligation. Demonstration takes only minutes. All you need is a place to hang the Hoist and an electrical outlet (or 12-volt battery).

HANDLES ANY LOAD

The 'Budgit' Electric Hoist can handle any kind of load up to 2 tons: machinery units, castings, crates, dies, pipe . . . anything. Works indoors or out. Has two automatic brakes for extra safety. Either alone can hold the load.

One-hand control leaves your other hand free to guide the load. Hairline stops and starts let you "spot" your load gently within 1/100th of an inch.

AC and DC models. Also 12-volt battery models for use on trucks. Prices start at $159.

Call your Shaw-Box distributor today or write for your copy of Bulletin 402 and 404. No obligation of course.

58A-2

MAXWELL MANNING MM&M MOORE INC. TRADE MARK

'Budgit'® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*

Foundry Statistics

ALUMINUM

(Shipments of castings—1000 pounds[1])

	Shipments				Unfilled Orders[2]
	Total	Sand	Perm. Mold	Die	
1955	827,162	165,482	298,349	355,203	.....
1956					
Nov.	69,058	14,346	20,673	33,938	113,356
11 mo.	727,630	158,576	224,864	343,290	.....
Dec.	66,951	13,405	20,557	32,940	118,185
Total	794,581	171,181	245,421	376,230	.....
1957					
Jan.	72,999	14,201	20,963	37,194	116,088
Feb.	69,451	13,366	21,707	34,311	107,869
Mar.	74,527	13,914	22,974	37,521	107,963
Apr.	68,284	14,287	20,376	33,493	98,113
May	65,108	12,705	20,708	31,602	94,748
June	58,547	11,585	17,180	29,700	88,086
July	52,173	10,447	16,322	25,339	89,430
Aug.	55,735	10,996	18,398	26,319	89,826
Sept.	58,692	11,367	17,820	24,900	93,720
Oct.	64,140	11,570	20,543	31,936	91,817
Nov.	58,898	10,411	18,611	29,793	91,860
11 mo.	698,554	134,849	215,602	342,108	.....

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments		Standard		Pearlitic		Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	
1955	1,104,775	652,552	.....	.....	.....	.....	.....
1956							
Nov.	82,717	47,979	68,549	40,107	14,168	7,872	89,977
11 mo.	875,516	513,368	749,280	429,276	126,236	71,374	.....
Dec.	76,352	44,268	63,625	37,569	12,727	6,699	92,311
Total	951,868	557,636	812,905	466,845	138,963	78,073	.....
1957							
Jan.	85,977	51,508	71,689	43,401	14,288	8,107	93,886
Feb.	78,028	46,729	65,411	39,590	12,617	7,139	90,725
Mar.	78,013	48,311	64,560	23,915	13,453	7,666	89,431
Apr.	80,271	51,320	65,990	42,810	14,281	8,510	83,116
May	76,504	46,277	63,058	38,072	13,445	8,205	79,787
June	72,556	44,639	59,829	36,892	12,727	7,747	76,331
July	57,748	34,876	45,101	27,290	12,648	7,586	80,694
Aug.	65,426	39,644	55,320	33,781	10,106	5,863	84,876
Sept.	62,457	38,397	52,281	31,658	10,176	6,739	83,385
Oct.	77,667	45,989	66,043	39,269	11,624	6,720	82,995
Nov.	67,904	38,085	55,564	31,036	12,340	7,049	80,074
11 mo.	802,551	485,775	664,846	387,714	137,705	81,231	.....

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments			Unfilled Orders[2]
	Total	Sand	Perm. Mold	
1955	1,008,998	905,867	63,111	.....
1956				
Nov.	72,866	65,022	4,114	52,643
11 mo.	901,109	808,614	53,753	.....
Dec.	65,197	57,931	3,769	56,556
Total	966,306	866,545	57,522	.....
1957				
Jan.	82,025	73,202	4,510	57,422
Feb.	72,084	64,346	4,188	54,133
Mar.	77,418	69,258	4,445	49,135
Apr.	77,167	69,141	4,316	48,148
May	75,347	67,251	4,421	46,791
June	70,959	63,910	3,590	44,232
July	60,621	54,847	3,010	44,175
Aug.	71,233	64,953	3,278	40,446
Sept.	70,804	64,470	3,243	40,298
Oct.	81,836	74,391	3,693	39,063
Nov.	70,187	63,944	3,006	34,249
11 mo.	809,681	728,713	41,650	.....

MAGNESIUM

(Shipments of castings—1000 pounds[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1955	27,854	25,294	....
1956			
Nov.	2,892	2,715	7,984
11 mo.	33,374	30,968	....
Dec.	2,794	2,612	7,616
Total	36,168	33,580	....
1957			
Jan.	3,207	3,017	8,245
Feb.	2,661	2,473	8,276
Mar.	2,970	2,804	7,690
Apr.	2,896	2,723	7,542
May	2,832	2,706	7,188
June	2,973	2,817	6,765
July	2,544	2,384	6,964
Aug.	2,315	2,150	6,222
Sept.	2,279	2,071	5,705
Oct.	2,192	2,093	5,318
Nov.	1,920	1,806	4,802
11 mo.	28,789	27,044	....

PRODUCTION WORKERS

Estimated Number

	Nov. 1957	Oct. 1957	Nov. 1956
Ferrous	187,700	190,800	209,800
Nonferrous	60,700	62,900	69,100

Average Weekly Earnings

Gray Iron	83.18	83.85	84.59
Malleable Iron	85.73	84.29	85.44
Steel	91.63	93.21	95.30
Nonferrous	91.34	91.64	90.76

Average Weekly Hours

Gray Iron	37.3	37.6	39.9
Malleable Iron	38.1	37.8	40.3
Steel	38.5	39.0	41.8
Nonferrous	39.2	39.5	40.7

Source: Bureau of Labor Statistics.

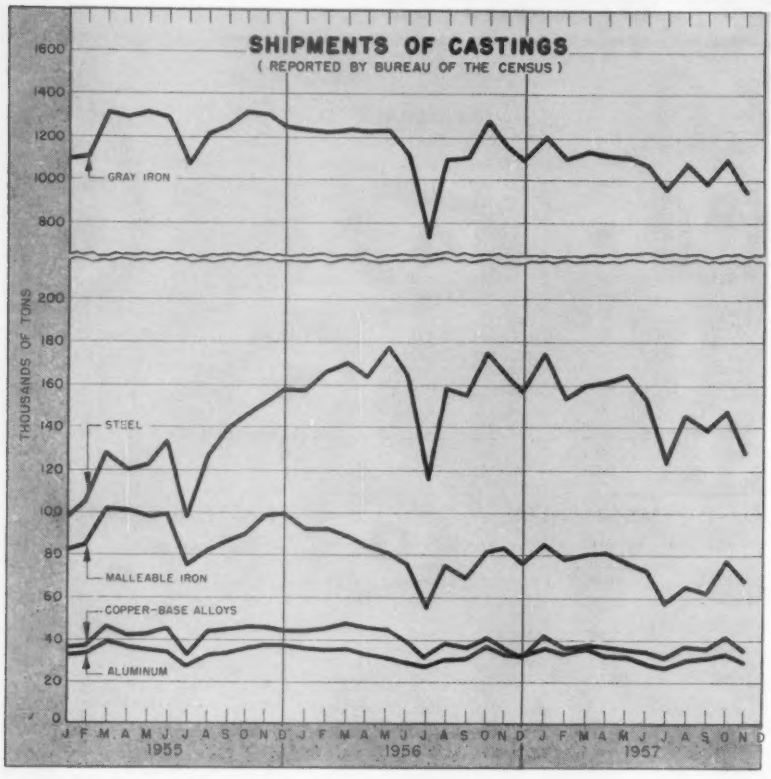
GRAY IRON CASTINGS—SHIPMENTS (Net tons[1])

	All Castings		Miscellaneous Castings		Nodular Iron Castings	Heavy Steel Ingot Molds	Chilled Railroad Car Wheels	Pressure Pipe & Fittings	Soil Pipe & Fittings	Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	Total	Total	Total[3]	Total[3]	
1955	14,837,745	7,987,205	9,161,685	3,715,963	.....	2,739,864	385,041	1,681,630	869,558	.....
1956										
Nov.	1,175,572	634,856	720,263	303,938	.....	251,262	27,852	116,157	60,038	916,723
11 mo.	12,751,534	7,376,089	7,583,692	3,369,208	.....	2,369,443	380,317	1,654,463	763,619	.....
Dec.	1,108,993	587,046	681,834	281,527	.....	254,703	25,874	92,439	54,143	920,034
Total	13,860,527	7,963,135	8,265,526	3,650,735	.....	2,624,146	406,191	1,746,902	817,762	.....
1957										
Jan.	1,213,215	642,317	761,697	320,058	.....	261,961	31,139	101,069	57,346	904,860
Feb.	1,103,118	582,010	705,585	302,514	.....	230,126	30,079	89,146	48,182	931,054
Mar.	1,133,146	604,481	713,767	305,104	.....	214,775	36,995	108,158	59,451	934,847
Apr.	1,120,349	611,443	699,395	298,319	.....	192,199	36,979	128,710	63,066	899,074
May	1,112,096	625,496	674,460	291,557	11,206	192,336	34,406	141,685	69,209	879,825
June	1,058,464	599,494	630,513	274,115	10,207	193,640	32,087	131,360	70,864	853,012
July	954,102	523,489	565,897	243,187	10,901	190,434	31,209	106,532	60,030	825,676
Aug.	1,075,957	596,779	630,130	265,185	10,339	205,655	28,976	238,209	72,987	825,676
Sept.	990,139	563,477	579,444	259,649	10,253	202,911	23,681	119,689	64,411	805,301
Oct.	1,099,554	601,109	668,895	282,024	11,974	210,521	26,306	122,149	71,683	740,169
Nov.	940,138	482,732	599,292	242,847	10,601	166,652	24,302	91,138	58,754	704,623
11 mo.	11,800,278	6,432,732	7,229,075	3,084,559	.....	2,261,210	336,159	1,377,845	695,983	.....

STEEL CASTINGS—SHIPMENTS (Net tons[1])

	All Castings			Carbon			Alloy			Unfilled Orders[2]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	
1955	1,530,694	1,166,706	236,880	1,088,489	814,258	219,602	445,769	354,452	17,278	.....
1956										
Nov.	164,114	126,900	28,284	122,212	93,262	26,436	41,902	33,638	1,848	545,862
11 mo.	1,773,262	1,386,721	335,838	1,306,442	1,027,368	282,864	448,820	359,353	21,874	.....
Dec.	158,725	125,569	34,080	120,326	94,741	32,227	38,399	30,828	1,853	521,782
Total	1,931,987	1,512,290	368,918	1,444,768	1,122,109	345,091	487,219	390,181	23,827	.....
1957										
Jan.	169,240	133,826	30,090	125,389	98,533	27,739	43,851	35,293	2,351	519,575
Feb.	154,932	121,667	27,181	114,805	89,480	25,060	40,127	32,187	2,121	511,806
Mar.	160,054	124,416	29,968	121,089	93,466	27,683	38,965	30,950	2,285	503,407
Apr.	162,498	124,549	29,708	122,894	93,512	27,624	39,604	32,037	2,084	497,632
May	164,575	125,431	32,840	124,840	94,635	30,926	39,735	30,796	1,914	504,990
June	153,647	119,353	31,338	116,759	91,009	28,766	36,888	28,344	2,572	494,267
July	122,018	90,037	22,803	91,730	67,719	21,426	30,288	22,318	1,377	489,390
Aug.	145,926	111,080	33,641	113,167	86,407	31,639	32,759	24,673	2,002	471,190
Sept.	139,002	105,611	29,718	106,261	80,871	27,885	32,741	24,740	1,863	438,510
Oct.	146,397	113,216	31,477	110,100	85,144	29,320	36,297	28,072	2,157	395,907
Nov.	127,115	97,856	26,892	93,343	71,846	25,105	33,772	26,590	1,787	362,948
11 mo.	1,645,494	1,267,042	325,656	1,240,377	952,622	303,143	404,627	317,197	22,513	.....

[1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale.



COKE PRODUCTION AND CONSUMPTION

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1955	75,150,247	76,266,385	3,154,052
1956			
Oct.	6,742,483	6,951,386	253,147
10 mo.	60,994,165	59,312,872	2,391,300
Nov.	6,328,272	6,681,074	237,330
Dec.	6,615,935	6,959,900	224,452
Total	73,938,372	72,953,846	2,853,082
1957			
Jan.	6,857,640	7,096,024	241,014
Feb.	6,211,845	6,302,583	228,569
Mar.	6,894,121	6,803,311	232,266
Apr.	6 436,273	6,396,900	226,698
May	6,632,519	6,521,817	219,675
June	6,362,335	6,318,339	188,487
July	6,501,266	5,888,057	180,014
Aug.	6,518,060	6,400,036	206,907
Sept.	6,296,519	6,186,475	199,226
Oct.	6,274,406	6,135,026	214,576
10 mo.	64,984,984	64,048,568	.....

INGOT BRASS AND BRONZE

(Shipments in net tons)

	1956	1957
Jan.	27,736	25,681
Feb.	24,949	20,769
Mar.	28,310	21,948
Apr.	25,808	23,507
May	23,437	22,037
June	18,842	18,888
July	17,364	16,695
Aug.	23,812	19,654
Sept.	20,929	19,670
Oct.	23,045	22,800
Nov.	21,818	19,767
Dec.	18,046	16,875
Total for year	274,096	248,291

Source: Defense Council of the Ingot Brass and Bronze Industry.

ZINC-BASE ALLOYS

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1955	778,000	493,244	.....
1956			
Nov.	65,443	40,189	74,623
11 mo.	635,145	412,954	.....
Dec.	58,583	36,562	75,293
Total	693,728	449,516	.....
1957			
Jan.	67,964	42,189	75,503
Feb.	59,793	36,580	74,739
Mar.	61,378	40,593	64,466
Apr.	54,982	34,801	59,534
May	53,565	35,676	66,712
June	49,356	33,206	64,137
July	48,379	29,418	64,043
Aug.	49,829	34,040	64,789
Sept.	47,736	33,838	68,122
Oct.	62,332	39,990	69,275
Nov.	58,689	35,005	63,665
11 mo.	614,004	395,336	.....

INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1956	1957
Jan.	195.6	117.9
Feb.	169.0	188.4
Mar.	152.7	127.0
Apr.	135.2	101.1
May	207.0	136.2
June	156.7	187.5
July	110.3	98.6
Aug.	188.3	231.3
Sept.	114.7	113.9
Oct.	122.2	145.3
Nov.	121.0	59.6
Dec.	115.6	....

Note: Figures are percentages of the base period 1947-49 taken as 100 per cent monthly average. This is a new base period. Source: Foundry Equipment Manufacturers Association.

IRON AND STEEL SCRAP CONSUMPTION

(Gross tons*)

	All Scrap Total	By Types of Furnace: Cupola Total	Air Total	Electric Total
1955	72,654,925	10,786,957	1,273,470	8,757,593
1956				
Oct.	6,722,320	890,389	101,773	935,008
10 mo.	59,138,587	8,272,425	955,378	8,135,593
Nov.	6,305,947	822,542	95,890	875,524
Dec.	6,264,955	722,320	82,160	851,770
Total	71,709,489	9,817,287	1,133,128	9,862,887
1957				
Jan.	6,630,804	874,764	102,782	927,499
Feb.	6,038,436	804,185	93,902	834,843
Mar.	6,294,038	814,372	92,534	903,149
Apr.	5,816,309	835,027	97,289	807,922
May	5,753,435	812,141	92,260	786,210
June	5,430,607	744,790	80,063	705,590
July	4,897,752	652,773	68,504	629,395
Aug.	5,299,543	765,877	81,941	759,517
Sept.	5,033,998	721,125	82,948	672,597
Oct.	5,333,767	817,338	91,766	718,791
10 mo.	56,548,689	7,842,392	883,989	7,745,513

PIG IRON PRODUCTION AND CONSUMPTION

	Production** (Standard grades—net tons): Total	Foundry	Malleable & Silvery	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace—gross tons): Total	Cupola	Air	Electric
1955	77,114,073	2,858,957	3,884,971	62,570,394	7,799,751	68,944,698	5,326,534	260,008	246,406
1956									
Dec.	7,268,743	149,745	322,631	6,099,101	697,266	6,237,538	391,632	21,557	17,161
Total	75,301,134	2,402,861	3,733,258	61,900,276	7,264,761	60,571,150	4,419,655	242,144	190,386
1957									
Jan.	7,209,547	135,608	344,073	6,081,137	648,699	6,482,472	423,660	22,989	20,431
Feb.	6,596,133	154,543	294,491	5,414,732	730,794	5,860,099	369,206	20,743	19,443
Mar.	7,179,100	168,650	347,451	6,008,135	654,864	6,155,334	370,915	20,241	23,259
Apr.	6,810,102	162,023	329,180	5,686,507	632,392	5,586,587	369,359	20,495	19,756
May	6,877,052	258,638	313,583	5,720,212	584,619	5,862,966	362,085	19,201	17,869
June	6,593,326	243,789	318,906	5,436,203	594,428	5,672,086	335,574	17,044	17,744
July	6,625,901	221,929	336,590	5,515,736	551,646	5,558,702	306,119	14,735	17,992
Aug.	6,719,763	228,378	298,269	5,451,691	741,425	5,769,995	349,988	17,540	25,948
Sept.	6,569,074	218,297	292,244	5,272,056	786,477	5,645,036	321,728	17,084	28,638
Oct.	6,454,450	164,944	303,104	5,390,851	595,551	5,669,624	354,364	18,466	24,691
Nov.	5,711,242	153,722	290,547	4,759,255	507,718	.....	.....	.....	.....
Dec.	5,212,624	165,268	228,897	4,394,869	423,590	.....	.....	.....	.....
Total	78,557,011	2,275,789	3,697,335	65,131,684	7,452,203	.....	.....	.....	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.

"3/4 pint of Cities Service Core Oil to 240 pounds of sand"

Short baking time, excellent shakeout

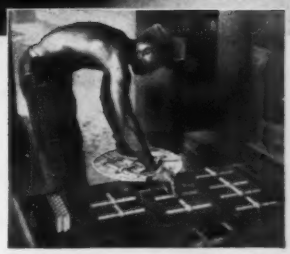
Model Brass Company of Decatur, Illinois produces 50,000 pounds of brass castings a month, mainly pump parts demanding the greatest precision in the making of cores.

That in itself would require an excellent core oil. But in addition, "90% of the castings made today are shipped tomorrow," according to General Manager Charles T. St. Clair.

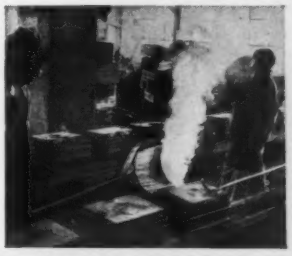
"That means we've got to have an oil with the fastest possible baking time and clean, quick shakeout properties.

"For these purposes, we've never seen the match of Cities Service Delco #62 Core Oil. And most unusual of all is the fact that such a small quantity of the oil goes such a long way. We actually use only ¾ of a pint of Cities Service Delco Core Oil for every four pans or 240 pounds of sand!"

When the jobs are tough and the time is short—that's the time for Cities Service Core Oils. Find out what they'll do for you. Talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, 20 North Wacker Drive, Chicago 6, Illinois.



Cores are placed in position before the pour. Model Brass is able to quick-bake its cores, maintain precision, and speed production with Cities Service Core Oil.

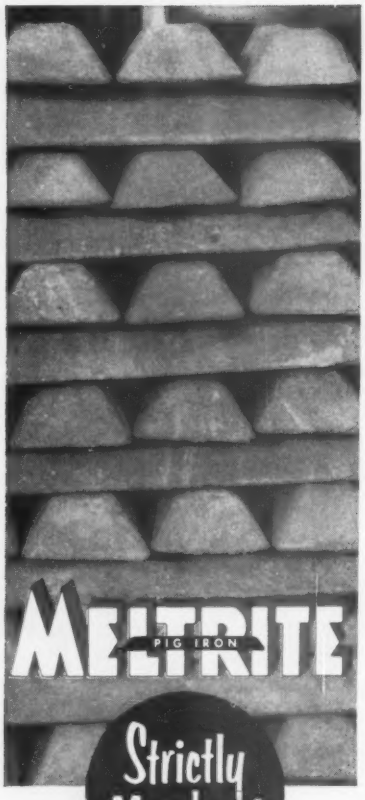


Made with 85-5-5-5 Brass, 90% of Model's castings are pressure tested. They've got to be good, and so has the Cities Service Delco Oil used in the cores.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Circle 691 on Page 51



Strictly Merchant

Meltrite is strictly a merchant pig iron. The entire production is *for sale* at all times.

Always in dependable supply.

SERVICE DEPARTMENT AVAILABLE WITHOUT OBLIGATION

Serving Industry Since 1883

PM

PICKANDS MATHER & CO.
CLEVELAND 14, OHIO
Chicago • Cincinnati • Detroit • Duluth
Erie • Greensboro • St. Louis • Washington

IRON ORE • PIG IRON
COAL • COKE • FERROALLOYS

Circle 692 on Page 51

Meditations of a Sandman

By HAROLD E. HENDERSON
H. C. Macaulay Foundry Co.
Berkeley, Calif.

"An Innocent Abroad"

RECENTLY, I received a letter from an English friend, Harry Richards, who, with three other members of his family, directs the destiny of Richards Foundries Ltd., Leicester. He operates two plants of widely different character. One is a conservative jobbing shop where trowel and handrammer are in conspicuous use; the other belongs in the high-production category and utilizes the most modern equipment available.

As I reread Harry's letter, my mind drifted back to a momentous day in 1952. I had just boarded the "President's Special," a commodious, double-decked passenger plane scheduled for the London hop. The stewardess was too preoccupied to assist this nervous novice, and with seat stub in hand, I edged down the aisle, squinting at the little brass-numbered tags above the portholes until I finally spotted my 18-W, a so-called window seat.

The seat on the aisle already was occupied by a genial Englishman who drew in his legs to let me climb over. After the exchange of opening banalities, he suggested that inasmuch as we were to be cooped up together for the next ten hours, we might as well introduce ourselves. He explained that he was Harry Richards of London, and offered me an outstretched hand.

I presented him with one of my newly embossed cards ($2.00 per hundred), which he read with an expression that betrayed something slightly short of amazement, then burst into one of those belly laughs peculiar to Englishmen who have been out too long in the midday sun!

Yes, he was a foundryman, and, as I later was to learn, a very successful one. After we had consumed

MILWAUKEE SOLVAY

Highest Quality Foundry Coke

SINCE 1904

MILWAUKEE COKE SOLVAY

Year after year MILWAUKEE SOLVAY COKE ranks as a superior foundry coke...made from *carefully selected* coal:

1. Low in ash
2. Low in sulphur
3. High in carbon
4. Highly resistant to shatter and abrasion

SERVICE DEPARTMENT AVAILABLE WITHOUT OBLIGATION

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IRON ORE • PIG IRON
COAL • COKE • FERROALLOYS

Circle 693 on Page 51

This is it...

THE NEW MIRACLE LIQUID PARTING

DELTA PART-RITE

FOR PERFECT MOLDS AND CORES

- Sand flows and packs freely to give perfect reproductions of pattern details.
- Patterns and core boxes stay cleaner longer with one application.
- No sand sticking.
- Use at any temperature.
- Protects patterns and core boxes against corrosion.
- Water repellent — contains moisture blocking agent.
- High lubricity reduces sand abrasion damage.
- Use sparingly — a micro-film is all that's necessary on patterns and core boxes.
- Fast, easy, economical. Costs less to buy, even less to use.

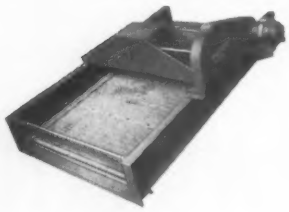
Working samples and complete literature on Delta Part-Rite will be sent to you on request for test purposes in your own foundry.

DELTA

DELTA OIL PRODUCTS CORP.
MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

An Exceptionally Efficient



Screen for the Foundry

The Leahy No-Blind® Vibrating Screen has been designed for utmost screening efficiency in the fine mesh range. It is particularly useful, therefore, in the foundry where fast, accurate, screening is appreciated. The exclusive differential vibration feature clears the mesh during normal screening, and when damp and difficult sands must be handled, FlexElex® heating of the jacket, when added, keeps the mesh dry and wide open.

For full information ask for Bulletin 16-EH

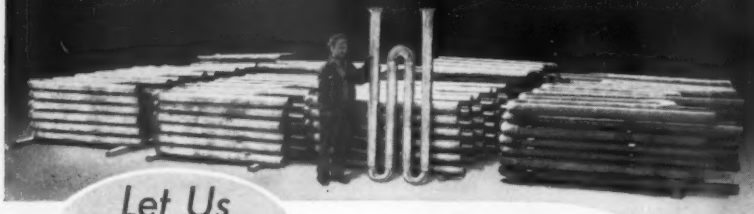
The Original Deister Co. • *Inc.* 1906

The Deister Concentrator Company

935 Glasgow Ave. • Fort Wayne, Ind., U. S. A.

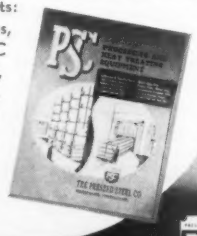
Circle 695 on Page 51

PSC Sheet Alloy Radiant Tubes COST LESS • LAST LONGER



Let Us Demonstrate This

If you are using cast alloy tubes, we can quote you substantially less on our all-sheet alloy tubes. And, with dies on hand for many commonly used sizes of return bends, we can frequently save our customers this important cost. Records of scores of installations show PSC "Thin Wall" tubes are giving much longer service life. For instance, Michigan Malleable Iron Co. reports: "We show an average life of over 3½ years for your fabricated tubes, which is about double our experience with cast alloy tubes". In PSC tubes the return bends are of the same metal and thickness as the legs, promoting uniform flow of gas and minimizing carbon build-up and consequent burn-out. Precision-assembled in any design or dimension. Also sheet-alloy heat-treating retorts and covers, boxes, baskets, fixtures, tubes, etc. We invite your inquiries.



Send for PSC Heat-Treat Catalog 54

THE PRESSED STEEL CO. • Wilkes-Barre, Pa.

Circle 696 on Page 51

a dinner which was altogether too good for any king, we drained the last drops from our third serving of champagne and stumbled below (downstairs to you groundlings), where we indulged in added refreshments (on the house) and proceeded to talk "sand and foundry" between puffs of mellow pipe-smoke.

At one point in the conversation, he interrupted me (very discourteous of him) to ask whether I ever had been to England.

I said, "Only in my imagination."

He countered with, "Well, son, you're there now! We're dropping onto London airport."

London; The land of Shakespeare, Dickens, and Barmaids! It was a dream from which I hoped never to awaken! But all dreams must end in a return to grim reality, so again I find myself immersed in the problems of delinquent sand.

Harry's letter had revived the dream, and it also reminded me that the differences to be found in our respective countries, with regard to language, food, clothes, and entertainment, also are reflected in the behavior of our sands. They too exhibit a variance in keeping with their geographical origin.

Richards has made several trips to the United States in the years that followed our first meeting, and he has in fact visited me twice in Berkeley. Our friendship has advanced to a point where we are practicing each other's choice bits of slang and colloquialisms.

He insists on calling my muller, a "mill," for example. However, the difference is strictly superficial. In the letter before me, he says, "we have deciced to try to find a sand technician, since at the moment we have no specific person,

"Personally, I think your ideas are bigger than your smelting pot."

Save Time, Maintenance and Money In Your Metal-Melting . . .

Specify Norton Refractory Cements

FOR FERROUS METAL-MELTING

type of equipment	metals melted	use of cement	Norton cement recommended			how applied
			number	maturing temperature		
indirect arc	alloy iron and steels	lining	RA 1307	1150°C	2100°F	rammed
		patching	RA 1307 RA 1162	1150°C 1000°C	2100°F 1850°F	rammed rammed
direct arc	alloy steel and malleable iron	troweling around electrodes	RA 1162	1000°C	1850°F	trowled
		lining roof and around electrodes	RA 1307	1150°C	2100°F	rammed
high frequency induction	stainless steel and refractory alloys	lining	RM 1170	1150°C	2100°F	rammed (dry)
		patching large furnaces	RM 1152	1200°C	2200°F	rammed
		patching small furnaces	RM 1992	1100°C	2000°F	troweled or rammed
ladles	iron and steel	lining	RA 1307	1150°C	2100°F	rammed

FOR NONFERROUS METAL-MELTING

low frequency induction	Al, Te, Si bronzes	lining	RM 1140	1250°C	2300°F	rammed
	general purposes	lining	RA 1307	1150°C	2100°F	rammed
indirect arc	brasses and bronzes	lining and patching	RA 1307	1150°C	2100°F	rammed
crucible melting furnaces ■	brasses and bronzes	lining and patching	RC 1188	1100°C	2000°F	rammed
reverberatory furnaces ▲	brasses and bronzes	lining and patching	RC 1188	1100°C	2000°F	rammed

■ Cement not in contact with metal; used in combustion chamber. ▲ Cement in contact with metal.

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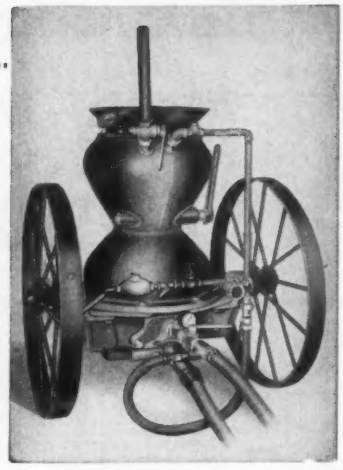

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Circle 699 on Page 51

or shall I say no person of substance or importance, to undertake these duties."

Harry, you have tickled the cockles of my heart! I would point up the significance of your statement to every foundryman in the world: "A sand technician of substance and importance."

My boss has been looking for one for years! Be that as it may, I wish you success in the search, and I could be flattered in the belief that perhaps some of my rambling remarks have stimulated your present aim.

Richards continues his letter with a somewhat detailed account of the present equipment in his sand lab. He names a standard rammer, compression tester, permeability meter, moisture tester, and screens all, I believe, of English manufacture.

He says that he is sure that much of his equipment is out of date and implies that he would welcome my opinions regarding this matter.

Of course, in answering Richard's letter, I probably, as a loyal American, should have insisted that only American-made sand testing equipment is suited to present-day needs and that he should refit his laboratory immediately with all new instruments bearing the U. S. A. label.

Harry Dietert probably will never speak to me again, when I confess that in my younger days I believed that sort of nonsense. The non-American product may differ strangely from ours in many ways, but to differ, is not necessarily to be inferior. In being requested to advise Richards, I was of course unduly flattered. There is an exhilarating stimulation even in the suggestion that someone may respect your opinion. (It happens so seldom.)

I swallowed the bait. In my usual verbose manner, I endeavored to advise my British cousin. I told

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Circle 700 on Page 51

him that I would hazard the guess that with a "man of substance and importance" as his sand technician, he need not be worried greatly about the obsolesence of the laboratory instruments.

And this brings me to my annual gripe. Assuming that we have the best sand-testing equipment on earth, just how valuable does it become when most of us don't know how to use it properly or only resort to it at infrequent intervals, after things have gotten so far out of line that Sanders and Schureman would have to combine forces for a month to untangle the mess?

Here on the West Coast, we no longer fight Indians, and we actually are becoming quite civilized. But apparently our eastern equipment and machinery suppliers haven't learned of this fact, for once they crate a machine or instrument and start it on its way westward, they obviously wash their hands of all responsibility in connection therewith. We seemingly are at their mercy, with inadequate instructions—separated from desperately needed service by 3000 miles of slow freight—and by the same barrier when a costly breakdown occurs.

We can make our own wheelbarrows and fix 'em, but the proper use of sand testing equipment calls for something more than a few pages of typed instructions. Of course, if you're real proud, you'll never admit that you don't know the answers. You paid real money for the "stuff," and you just wouldn't want anyone to know that it was standing there gathering dust. So you go blithely on your way, insisting that everything is just dandy! Mebbe some of us have exceeded the normal boundaries of stupidity, but I find that if I scream my head off, sometimes I get help.

Die Casting Engineers Elect

New officers for 1958 have been announced by the Society of Die Casting Engineers Inc., Detroit. Harry Cagin, Halex Die Casting Co., Cleveland, has been elected president of the society.

Other officers include Dean L. Rockwell, Clifford-Rockwell Co., Detroit, vice president, and M. R. Tenenbaum, Lester-Phoenix Inc., Detroit, secretary-treasurer.

Directors are William Van Raaphorst, American Mold Engineering Co., Charlevoix, Mich.; Harris R. Shimel, Cuyahoga Industries Inc., Detroit; and Herman J. Windolph, Holland Die Casting Inc., Holland, Mich.

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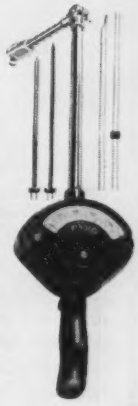

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Circle 701 on Page 51

Foundry Group Meetings

Twin City: "Foundrymen don't think," it was charged by W. A. Hambley, Charles A. Krause Milling Co., in speaking on "Casting Defects" before the AFS chapter at its Jan. 14 meeting at Jax Restaurant, Minneapolis.

Mr. Hambley said that the average foundryman has a tendency to make snap judgments or act on impulse rather than give a problem adequate thought. Both chronic and epidemic types of defects affect business in these ways: 1. Economically—by accounting for an annual loss of $325 million. 2. Customer Relationship—by charging him for our scrap and causing additional expense and delay when he machines a defective casting. Management, from the top executive down to the shop foreman, must take the blame for this waste.—*J. David Johnson, J. David Johnson Co.*

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Wisconsin— Instead of the usual sectional meetings, the program for the January 11 dinner meeting of the AFS chapter consisted of a panel discussion on sand reclamation by wet, pneumatic, and thermal methods. P. C. Fuerst, Falk Corp., Milwaukee was moderator.

Each of the following speakers

discussed one of the systems: R. K. Strong, Hydro-Blast Div., Guardite Co., who talked about wet sand reclamation; W. R. Ellenberger, Nichols Engineering & Research Corp., New York, who discussed the thermal method of reclamation, and R. L. McIlvane, National Engineering Co., Chicago, who explained that company's pneumatic reclamation equipment.—*John E. Hubel.*

Ontario—On Jan. 24, 171 members of the AFS Chapter gathered at the Royal York Hotel in Toronto to hear a talk by Victor Rowell, Harry W. Dietert Co., on "Automatic Sand Control."

Because of the more exacting demands of buyers with regard to surface finish and dimensional tolerances in castings, the foundryman must, of necessity, maintain close control over the consistency of his sand properties. Uniformity is also necessary for the efficient operation of automatic molding machines and core blowers.

Mr. Rowell described how these properties can be controlled in a sand system that runs by itself. The components of such a system are an automatic muller cycle control with a programming timer, cam-operated valves, and automatic sand distribution to molding hoppers. Mixing

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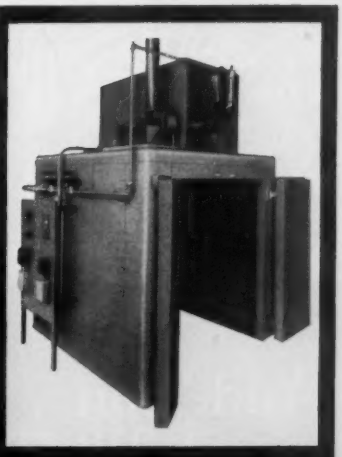

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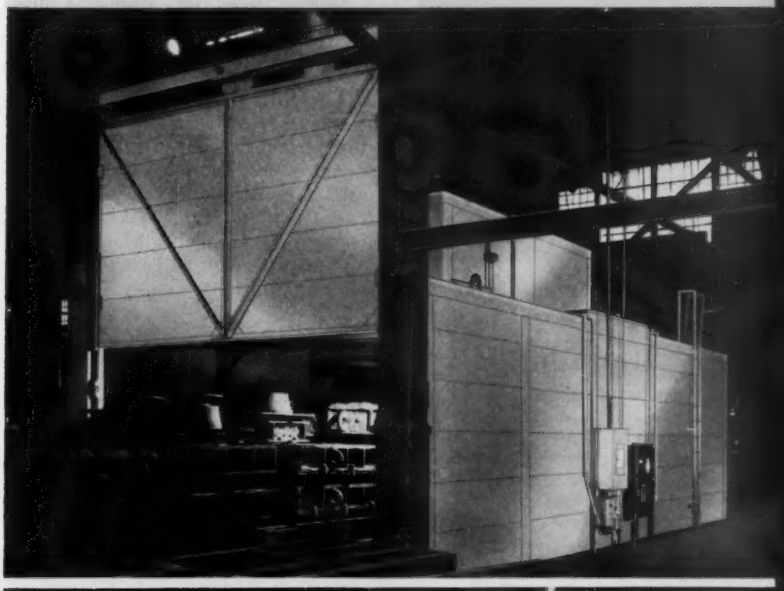

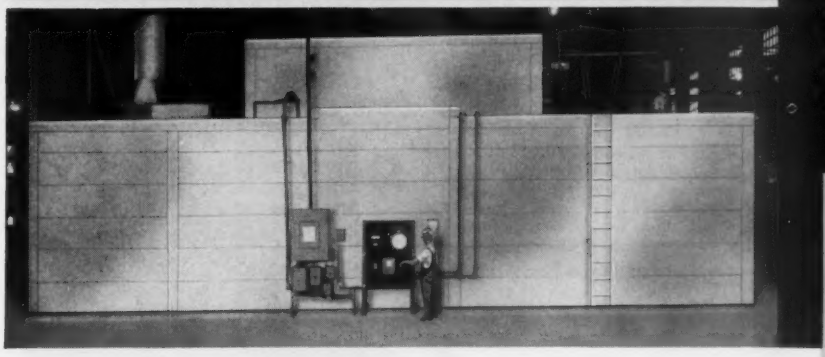

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Circle 704 on Page 51

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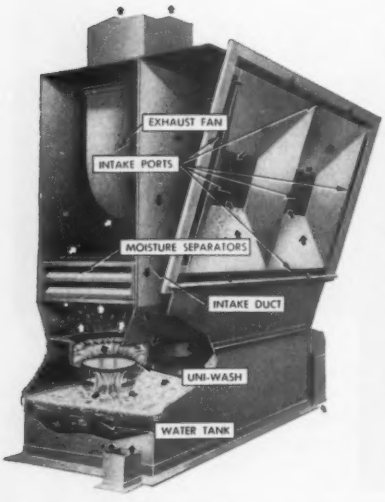

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Circle 705 on Page 51

and distributing labor is thereby eliminated.

Although maintenance on such a unit is no more than on any other electrical equipment, it requires a good understanding of the electrical principles involved.—*A. L. Cooper, National Iron Div., Canada Iron Foundries.*

Cincinnati District: The local AFS chapter observed Foundry Educational Foundation Night at its regular monthly meeting at Hotel Alms, Jan. 13. Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, Ohio, presided.

Anthony Haswell, Dayton Malleable Iron Co., who was active in the formation of the foundation, discussed the early history of the FEF. What the foundation is and what it does was explained by E. J. Walsh, its executive director.

Among the 100 attending the meeting were seven FEF scholarship holders from the University of Kentucky and two from the University of Cincinnati, plus several faculty members from each school. Each student was given a junior membership in the AFS by the chapter and also received a copy of the *Gray Iron Castings Handbook* from the Hamilton Foundry & Machine Co. —*James D. Claffey, Non-Ferrous Casting Co.*

Metropolitan—At the January 6 meeting of the Metropolitan Chapter held in Newark, N. J., the members broke up into three groups for technical discussions.

Technical chairman of the first group, Robert Fisher, Ingersoll-Rand, introduced F. E. Van Voris, metallurgical representative of Electro Metallurgical Co., division of Union Carbide Co. Speaking on

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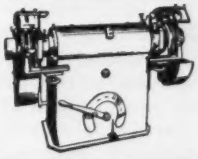

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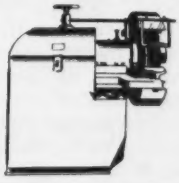

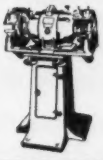

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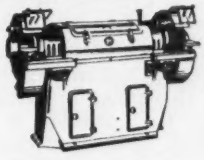

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Circle 706 on Page 51

"Modern Steel Melting Practice," Mr. Van Voris discussed the effects of the carbon monoxide boil used to flush out hydrogen and nitrogen, slag control, detrimental effects of hydrogen and nitrogen, best practices in the use of ladles and ferroalloys, effects of nitrogen on grain refinement, pinholing of steel castings, and a number of other interesting points. His talk was adequately augmented by slides.

John P. O'Neil, Flockhart Foundry, introduced Howard H. Wilder, the speaker for the second group. Mr. Wilder, manager of engineering sales, Vanadium Corp. of America, Chicago, spoke on "Cupola Operation." His talk covered different melt rates, coke and metal ratios, physical properties and the effects of various alloying elements on mechanical properties of iron. He also gave an interesting history of the cupola and covered its nomenclature.

The third group heard an informative talk on "Nonferrous Melting" by Norman A. Birch, director of research, National Bearing Div., American Brake Shoe Co. The speaker, introduced by Paul H. Ducharme, technical chairman, discussed the use and operational characteristics of nine types of melting units commonly used in nonferrous melting. The points covered in this interesting talk were comparative melting rates, capacities, melt losses, fuel maintenance costs, melting atmospheres, and types of alloys commonly melted in each.—*C. H. Fetzer, International Nickel Co.*

Pittsburgh—A large crowd of members of the Pittsburgh Chapter, AFS, met at Webster Hall Hotel, Jan. 20, for a dinner session. S. C. Massari, technical director, AFS, discussed "The Gating of Castings." His talk, concerning horizontal gating, was accompanied by a motion picture showing actual behavior of metal when poured into a mold. It showed the effect of design changes in a gating system.

Previous to the talk, members observed the death of Henry Spilker on Dec. 20. Mr. Spilker was one of the original members of the Pittsburgh Foundrymen's Association and a former president.

Mr. Massari discussed results of a $50,000 study conducted by AFS to make a fundamental study of the flow of fluid metal through the gating system. He pointed out that while defective castings result from several factors, it is necessary for a

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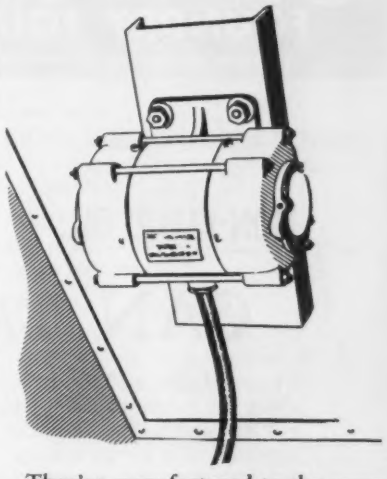

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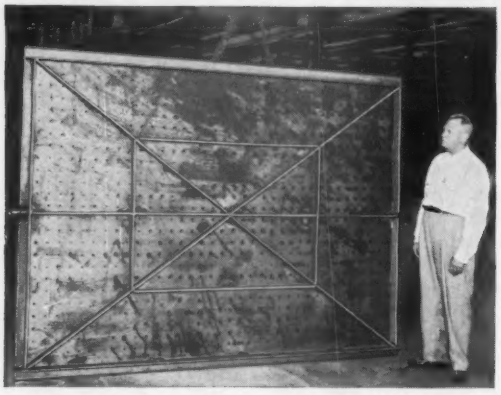

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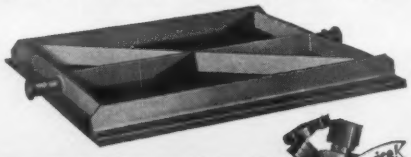

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good casting to get metal to the casting cavity with the least possible turbulence. Using high-speed photography in his tests, he showed where turbulence occurs and how it can be eliminated.

The speaker said that pouring directly down the sprue is detrimental to the casting. He explained the proper design of an improved gating system and showed, by means of the film, methods for minimizing turbulence.—*Robert M. Love.*

Philadelphia: A good attendance of 115 members and guests of the AFS chapter at the Jan. 10 meeting heard two excellent speakers discuss the use of insulators, chills, and exothermic materials.

Harold Bishop, technical director, and Michael Bock II, vice president, Exomet Inc., Conneaut, Ohio, explained use of these materials to improve casting quality and yield in both ferrous and nonferrous metals.

H. C. Winte, Florence Pipe, Florence, N. J., presided at the meeting, with Robert Mason, Treadwell Engineering Co., Easton, Pa., serving as technical chairman.—*E. C. Klank, Philadelphia Coke Co.*

Chicago—Four group sessions comprised the Feb. 3 meeting of the Chicago Chapter, AFS, at the Chicago Bar Association. Chapter President W. O. McFatridge, supervisor of foundry laboratory, Manufacturing Research, International Harvester Co., presided at the dinner business session attended by about 200.

The three immediate past presidents, R. P. Schauss, Chicago manager, Werner G. Smith Inc., J. T. Moore, vice president, Wells Mfg. Co., and R. L. Doelman, sales engineer, Miller & Co., were announced as the nominating committee to report on new officers and directors at the April meeting.

Clyde A. Sanders, vice president, American Colloid Co., addressed the nonferrous and gray iron divisions on "Molding Methods Compared." "Controlling Malleable Iron Scrap" was the subject discussed by Richard W. Heine, associate professor, metallurgical department, University of Wisconsin, Madison, Wis., at the malleable division session.

The steel and maintenance divisions joined to hear Francis H. Hohn, metallurgist, Scullin Steel Co., St. Louis, speak on "Vacuum Melting." "Patterns for Shell Molding" was the topic for the pattern division, with Harry Weaver, director of manufacturing, Brillion

Iron Works, Brillion, Wis., as the speaker.

The regular meeting on March 3 will kick off the chapter's educational course on "Four Methods of Coremaking." Speaker will be Elmer C. Zirzow, director of foundry service, Werner G. Smith Inc., Cleveland, and chairman of the national AFS Sand Division, and his topic "Why Four Methods of Coremaking?"

Second session of the course, at the Peoples Gas Auditorium, on March 10, will feature R. H. Greenlee, Auto Specialties Mfg. Co., St. Joseph, Mich., discussing "Oil Sand Cores," and Frank Soderstrom, Continental Foundry & Machine Division, Blaw-Knox Co., East Chicago, Ind., dealing with "Air Set Cores."

Third and final session, March 17, also at Peoples Gas Auditorium, schedules J. E. Stock, John Deere Tractor Works, Waterloo, Iowa, to discuss "Shell Cores," and George Nestor, National Malleable & Steel Castings Co., Cleveland, lecturing on "CO_2 Cores."—*Erle F. Ross.*

American Welding Society Plans Show and Meeting

At the annual national spring meeting of the American Welding Society to be held in St. Louis in conjunction with the sixth Welding Show, four of the 21 sessions will be co-sponsored by the metals engineering division of the American Society of Mechanical Engineers.

The three-day show will be held at the Kiel Auditorium, April 15-17, while the five-day technical sessions will be presented at the Hotel Statler there April 14-18. Program and hotel information are available from American Welding Society, 33 West 39th St., New York 18.

AMHS To Sponsor Technical Sessions at Handling Show

The Material Handling Institute Inc. has announced that the American Material Handling Society Inc. will sponsor the technical sessions to be held in conjunction with MHI's 1959 exposition of material handling equipment in Cleveland, June 9-12. The educational meetings also have received co-operative endorsement of the Material Handling Section, American Society of Mechanical Engineers, and of the Society for Advancement of Management.

BOOKS

of special interest to foundrymen

Our Book Department carries a wide variety of books of particular interest to foundrymen. Here are some titles presently available. If you are seeking a title not shown here, write us—we'll obtain it for you.

☐ **STEEL FOUNDRY PRACTICE**
496 pages, 252 charts of data on all phases of modern steel foundry practice by John Howe Hall. **$12.00**

☐ **PRINCIPLES OF METAL CASTINGS**
Covers every phase of standard foundry processes, what equipment is used and best procedures for greater economy in metal casting by Richard Heine and Philip Rosenthal. **$7.50**

☐ **ALLOY CAST IRON HANDBOOK**
Explains how to add alloys to secure greatest possible effect from their use. A practical book. **$4.50**

☐ **THE CUPOLA AND ITS OPERATION**
35 chapters on cupola operation with knowledge contributed by more than 50 foundrymen. **$9.50**

☐ **AMERICAN MALLEABLE IRON HANDBOOK**
Published by the Malleable Founders' Society as complete source of data on malleable iron. **$4.50**

☐ **FUNDAMENTALS IN PRODUCTION AND DESIGN OF CASTINGS**
By C. T. Marek. Correlates casting design with production economy with much data on good castings techniques. **$5.25**

☐ **NONFERROUS FOUNDRY METALLURGY**
By A. J. Murphy. Well-illustrated text of 497 pages covering all phases of nonferrous foundry metallurgy. **$12.50**

☐ **METALLURGY OF STEEL CASTINGS**
By Charles W. Briggs. A comprehensive work giving detailed data on chemistry, metallurgy and technology of steel castings. **$11.00**

☐ **FOUNDRY CORE PRACTICE**
Over 100 authorities collaborated with the author, Harry Dietert, to compile this practical, useful book on coremaking operations. **$10.00**

☐ **METALLURGY FOR ENGINEERS**
By J. Wulff, H. F. Taylor and A. J. Shaler. Aims to give the reader "an adequate understanding of metals so that he may intelligently select and use them." 624 pages, 290 illustrations. **$7.25**

☐ **BASIC COST PRINCIPLES FOR NONFERROUS FOUNDRIES**
The simplest and most complete method of costing ever prepared for nonferrous foundries. **$5.00**

FOUNDRY BOOK DEPT., 1213 W. 3rd St., Cleveland 13, Ohio
Please send me the books checked above for which I enclose $_____*
☐ Check ☐ Money Order ☐ Company Order.

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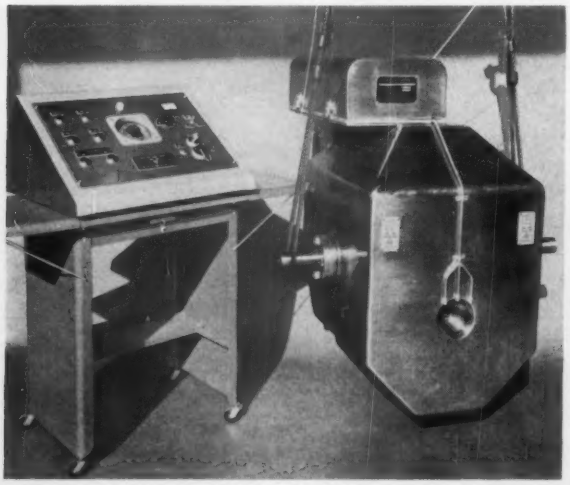
*Add 3% on orders for delivery in Ohio to cover sales tax.

The Shakeout

Installs 1000-curie Gamma Radiography Unit

A GAMMA RADIOGRAPHY machine with a capacity of 1000 curies of Cobalt 60 has been shipped to Dominion Foundries & Steel Ltd., Hamilton, Ont., by



Nuclear Systems, a division of Budd Co., Philadelphia. The 1060 series Multitron has a 5000-lb, heavily shielded, stainless-steel clad, lead-filled head which serves as both storage and shipping container. Operation is through a remote console with completely fail-safe electrical controls. The unit is said to be the largest ever built commercially.

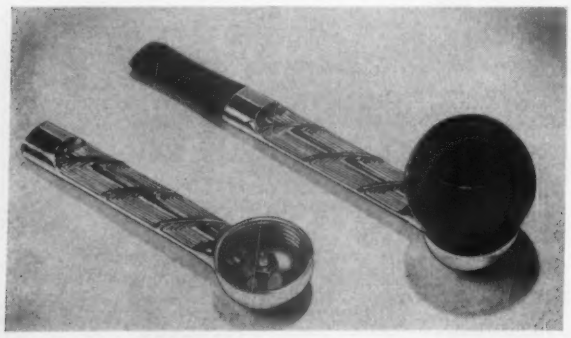
Dominion Foundries will use the machine, loaded with 700 to 750 curies of Cobalt 60 of approximately 50 curies per gram specific activity, for inspection of steel castings with sections up to 9 in. thick. The machine will be mounted on a specially designed manipulator which will allow movement in all directions. It will be installed in a concrete pit equipped with automatic monitoring safety devices.

For More Details Circle No. 479—Page 167

Pipe Stem Is Aluminum Diecasting

A NEW PIPE DESIGN developed by Aply-Tec, New York, combines a diecast aluminum stem with a briar bowl and a rubber mouthpiece. The tricky diecastings are produced by a member of the American Die Casting Institute, New York.

Diecast stems are cast with twin cooling shafts running the length of the smoke channel to cool and smooth the smoke. Cast into the stem is a device to permit regulation of the draft of the bowl and, thereby, the amount of smoke per puff.

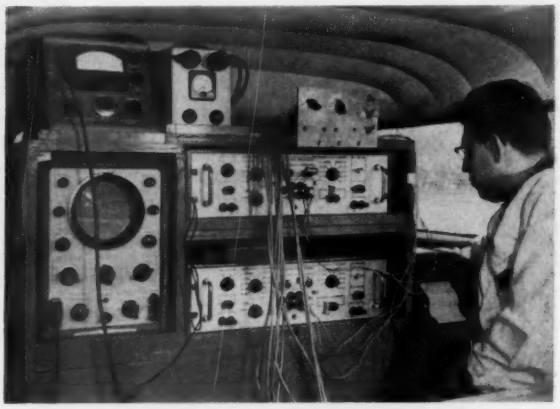


As received from the diecaster, the cast stems require only vacuum-deposited coatings of aluminum, gold, silver, or metallic pastels to prepare them for assembly with bowls and mouthpieces.

For More Details Circle No. 480—Page 167

Tests Car Castings in Operation

THE PORTABLE dynamic testing equipment shown here is mounted in an engineering test car at Central Foundry Div., General Motors Corp., to test castings



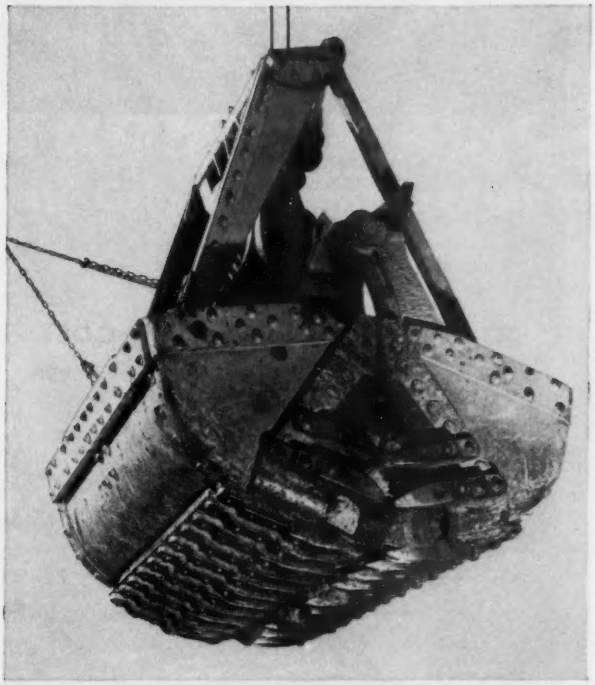
installed in the vehicle. Instruments show the performance of the test castings and are studied by a stress analyst of the division.

More Aluminum in 1958 Automobiles

USE OF ALUMINUM in 1958 American passenger cars has climbed to an average of 52.4 lb per car, a record 29 per cent above the figure for 1957 models, according to the 1958 annual survey by Aluminum Co. of America.

Automatic transmission assemblies continue to constitute the largest single tonnage application. This component now uses 19.75 lb per average 1958 car. Engine parts account for 16.78 lb, and the remainder is in power brakes and steering and miscellaneous applictions.

A newcomer to the list of big users of aluminum is the Buick Roadmaster, which utilizes 117 lb of the light metal. The illustration reproduced here shows the 74 parts which make up this total.



Blaw-Knox "Shark-Tooth" Foundry Buckets handle coke with minimum degradation!

Here is the bucket chosen by experienced Foundrymen. Designed and built to the specific requirements of Foundry operation, Blaw-Knox "shark-tooth" Buckets literally finger their way through coke, handle it with minimum degradation.

With quickly-attached liner plates, this versatile performer handles sand or other granular material without leakage. It's quick hook-on feature means that your crane is easily available for other Foundry Services.

An experienced Bucket engineer will be glad to study your operation, help you select the proper size, type and weight of Bucket for your operating conditions.

BLAW-KNOX COMPANY

Blaw-Knox Equipment Division

Pittsburgh 38, Pennsylvania

WRITE TODAY! You can get valuable engineering information on how to get improved Foundry operation with the help of Blaw-Knox Foundry Buckets. Ask for a free copy of Bulletin 2265.

BLAW-KNOX

Circle 712 on Page 51

GLUTRIN
LIQUID BINDER

GOULAC
DRY BINDER

For

CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

GENERAL OFFICES AND PLANT: • ERIE, PA.

Circle 713 on Page 51

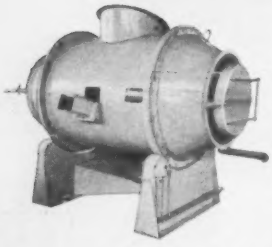
STROMAN

FURNACES For IRON or BRASS

Here are two exceptional Stroman Furnaces that will give you better melts, better castings and cut costs to the bone. Designed by the leading metallurgical engineers they will do their jobs more efficiently, faster and economically than old fashioned equipment. To compete in the foundry market you must modernize . . . and Stroman Foundry Equipment is the most modern and best you can buy.

INVESTIGATE THEM TODAY!

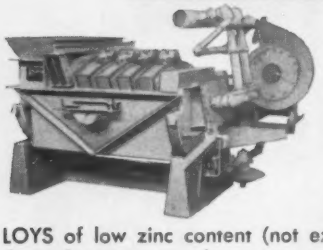
IRON MELTING



STROMAN TYPE "R.F." BARREL FURNACE

This open flame, barrel type furnace with burners firing tangent to the inside of the lining is designed to produce an ideal combustion arrangement for very tast melting of iron. It is applicable to jobbing gray iron foundries for its speedy melting cuts labor and fuel costs. It is easily charged. Capacities up to 20,000 lbs. iron.

BRASS MELTING



STROMAN TYPE "JC" CRADLE TYPE TILTING FURNACES

For melting COPPER BASE ALLOYS of low zinc content (not exceeding 7% zinc) these furnaces are the most economical available. Their rapid melting time, from 15 minutes up depending on the size of furnace assures lowest fuel consumption and as always in a Stroman Furnace maintenance is at a minimum. Operators are not exposed to excessive heat making excellent working conditions. They are recommended for production work. Capacities range from 400 pounds up to 20,000 pounds per heat.

Stroman makes all types of furnaces for the melting of brass, bronze, aluminum, iron, magnesium and all other non-ferrous metals. Write for new bulletin #150 describing Stromans complete line including metal handling and conveyor equipment.

STROMAN FURNACE AND ENGINEERING CO.

FRANKLIN PARK, ILLINOIS

Circle 714 on Page 51

Master Power

HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES

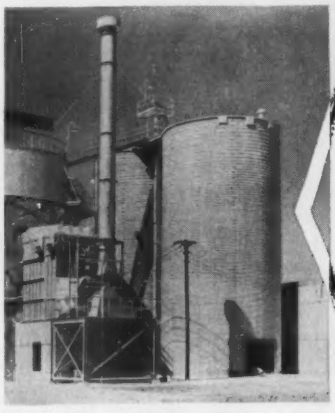
chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.

ORWELL, OHIO • U.S.A.

SALES • SERVICE • STOCK • COAST TO COAST

Circle 715 on Page 51



Before we built this bin we had to know . . .

1. **The characteristics of the material.**
2. **The method of loading.**
3. **The method of discharge.**

Over a long period of years, we here at Neff and Fry have learned that a *strong bin* is only part of the storage problem.

While we do not sell machinery, nor are we affiliated with any machinery manufacturers, we can be of great help to you in suggesting loading and unloading systems.

On your next storage bin, call us in on the early stages of planning. You will have a better bin.

It's the **STAVE** that makes the difference!

N & F

NEFF & FRY COMPANY

214 Elm St., Camden, Ohio

Circle 716 on Page 51

FOR STRONG, LIGHT CASTINGS
offer
FRONTIER 40-E
the Original High Strength Aluminum Alloy

Mamma's Mink, a 3-point hydroplane design, traveling at 120 m.p.h.

Frontier 40-E Aluminum Alloy Pistons in Marine Racing Engine stand up at terrific speed of 7000 r.p.m.

● Frontier 40-E Aluminum Alloy pistons, because of greater elongation factor and high tensile strength, were able to withstand the shock of this punishing service where other alloys failed.

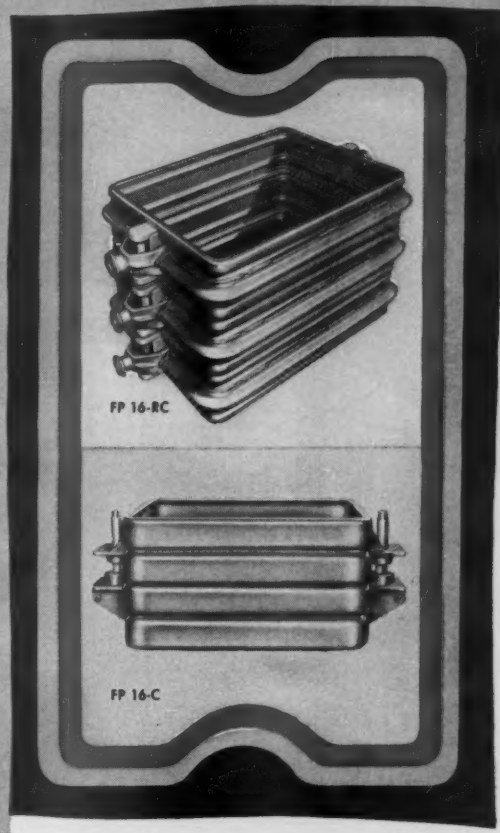
Castings made of Frontier 40-E actually grow stronger while in use. Tests made over a period of eight years show yield strength and tensile strength continue to increase. Other benefits are: shock resistance, corrosion resistance, pressure tightness, excellent machinability.

Frontier 40-E Aluminum Alloy is not a new, unproven metal. It is backed by more than 25 years of formulating "know-how". When you recommend castings of 40-E, you are building customer satisfaction.

FRONTIER BRONZE CORP.
4878 Packard Road, Niagara Falls, New York
Exclusive Foreign Producers of 40-E
Duralum Castings Ltd., Darlington, England
Paul Bergsoe & Son, Glostrup, Denmark L'Aluminum Francais, Paris, France

Circle 717 on Page 51

GREATER STRENGTH–INSIDE



by *American* of course

Added strength and rigidity of these flasks by American lies in the **inside corrugation.** American **INSIDE STRENGTH** of the 1/4" walls actually assures more rigidity than other type reinforcements, more resistance to squeeze of air pressure. Inside corrugation of the walls assist in holding sand—makes for easier shake out, and means that the flasks will maintain their shape and pincenters — give better, longer service.

★ Sturdy, durable streamlined design
★ Low Maintenance Cost ★ Easier to Handle

The number of inside corrugations is determined by depth of sections. For extreme pressure, sections may also be furnished with American's special channel welded reinforcement.

AFFCO superior flasks are the result of over 25 years research and best possible workmanship. Write for our new, complete Flask Catalog, and visit our booth #813 at the Foundry Show and Convention in Cleveland in May.

Our facilities assure you of prompt fabrication and quick shipment of your orders.

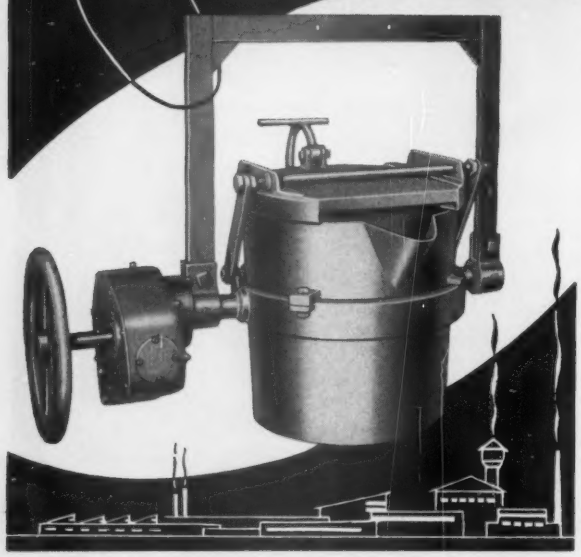
affco
Division of Cromb & Gagel, Inc.

AMERICAN FOUNDRY FLASK COMPANY
2745 SOUTHWEST BLVD., KANSAS CITY 8, MO.

Circle 718 on Page 51

JOB ENGINEERED
by
Industrial

YOU SEE THE DIFFERENCE WHEN YOU START TO POUR



All ladles look pretty much alike . . . but your crews can see and *feel* the Job Engineered advantages of Industrial ladles as soon as they start to pour.

Industrial Job Engineered ladles handle smoothly and easily through the entire pouring routine—tipping, making the pour, straightening and moving on to the next mold. Industrial's special gearing assures precise ladle control at all times . . . and eliminates binding as a result of heat distortion of ladle bowl. One man can easily handle the entire pouring operation. That's why Industrial ladles pay off in lower costs, more efficient operation every time your crews pour a casting.

The ladle shown is for smaller pouring jobs. It is equipped with Bantam Gearing, and offers all the Job Engineered features of Industrial's larger ladles—dependability, ease of operation, accuracy, no binding, one man handling. Send your pouring problems to Industrial Equipment Company—manufacturer of a complete line of standard and custom pouring and handling equipment—Bowls . . . Shanks . . . Bails . . . Tongs. Write today for latest catalog.

Industrial
EQUIPMENT COMPANY
115 OHIO ST., MINSTER, OHIO

Circle 719 on Page 51

NOW a SELF-ALIGNING

Contact Wheel

NEW R-57
Eliminates
VIBRATION
RUNS
SMOOTHER

Automatically aligns. New R-57. Rubber Arbor Hole Hub draws up tightly on spindle even when worn spindles are used . . . Eliminates Vibration . . . Low Operating Noise . . . Maximum efficiency of wheel, belt and machine.

ADDED R-57 FEATURES:

Lightweight, maximum safety. Available in plain or serrated faces in all durometers, for every grinding and finishing operation.

Write today for complete information and prices.

CHICAGO RUBBER COMPANY, INC.
651 Market Street • Waukegan, Illinois

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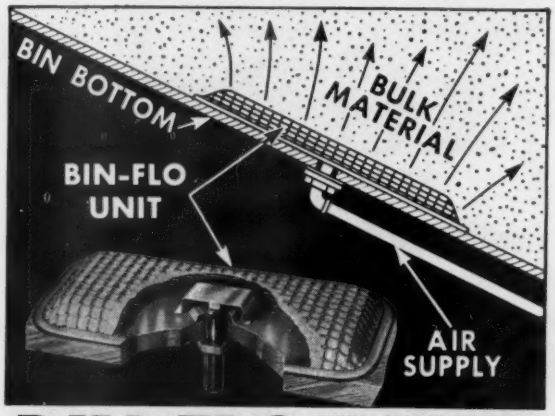

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BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR the original diaphragm-type bin level indicator. In successful use for over 20 years. **ROTO-BIN-DICATOR** new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

THE BIN-DICATOR CO.
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Write for detailed literature or call
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WE SELL DIRECT • PHONE ORDERS COLLECT

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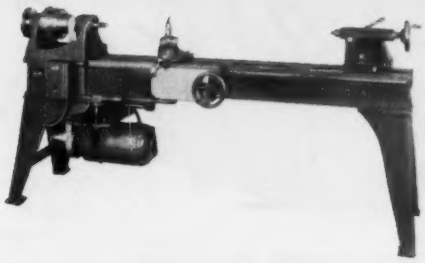
Turn large patterns faster, more accurately with this new OLIVER LATHE



The Oliver No. 20 Woodturning Lathe is one of a complete line for pattern shops. It embodies the latest engineering developments and is available in four sizes to swing 16", 20", 24" and 30" over bed. Standard beds are 8' and 10' long—longer beds furnished as an extra. The regular machines have 8 spindle speeds—16 speeds available on special order. Oliver Lathes are used in leading pattern shops. Write for Bulletin No. 20.

Oliver makes a full line of lathes and woodworking machinery for pattern shops

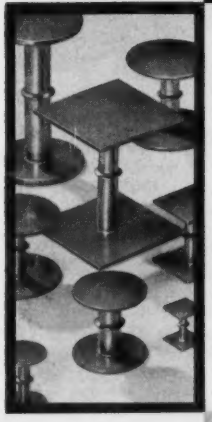
OLIVER SINCE 1890

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan

Circle 722 on Page 51

it's the fin that stops leakage

Buffalo **LEEK-PRUF-CHAPLETS**



Castings of uniform density are assured with "Buffalo" *Leek-Pruf* Chaplets. Exclusive fin design of both Double and Single head types prevents leakage and assures positive fusion with molten metal. There is no recess in the stem to weaken the structure. Thoroughly coated to insure instant fusion. "Buffalo" Chaplets burn in more easily without chilling.

A wide variety of other types is also available to meet your specific molding needs exactly. For complete information, request Catalog No. 20.

Trial samples of any chaplets furnished without charge.

Combined **Manufactured by**
SUPPLY & EQUIPMENT CO., INC.
211 CHANDLER ST., BUFFALO 7, N. Y.

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COLUMBIA-SOUTHERN SODA BRIQUETTES® for faster, better desulphurizing

The size and shape of Columbia-Southern Soda Briquettes have been scientifically designed to do a faster, better desulphurizing job in Blast Furnace and Foundry operations.

The walnut form exposes maximum surface area and it is a known fact that such maximum contact is a highly important factor in determining the percentage of sulphur reduction.

Aside from speedy and efficient desulphurization, Columbia-Southern Soda Briquettes accelerate production, increase fluidity, quicken the release of gases and impurities, allow for automatic slag skimming, and improve the refining value of the iron.

Order your supply today by name "Columbia-Southern Soda Briquettes." Packed in 100 lb. paper bags; easy to handle and store.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
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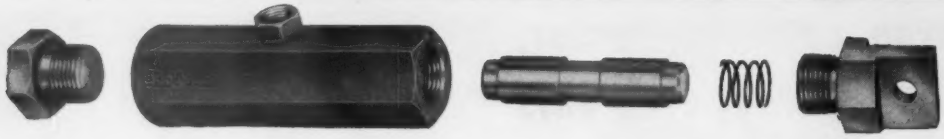
Circle 724 on Page 51



3 steel alloys*

Give Branford vibrators longer life

Strength and durability are built in . . . preserved . . . through specific steel alloys that give each part of each Branford Vibrator the properties it needs for a long serviceable life.

Branford Pistons are built from hard, chrome-coated steel, especially wear resistant to maintain efficient precision over long periods of use.

Springs made from high tensile, flexible steel flex themselves millions of times without fracture . . . without fatigue.

Branford body steel is rugged, tough, ready to take the torture and stress of vibration without breaks, cracks, and without frictional wear.

When you specify "Branford Vibrators" you receive unmatched performance, longer service, less down time.

Write for your Branford catalog and the name of your local Branford distributor.

*** Branford Vibrators are built in every size—and in every size they are built from steel throughout (including the bodies).**

THE BRANFORD COMPANY 130 CHESTNUT STREET — NEW HAVEN, CONNECTICUT

Circle 725 on Page 51

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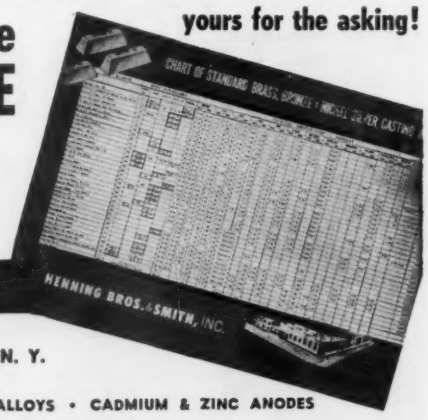
send for this valuable quick-reference 17" x 22" standard alloy wall chart FREE

yours for the asking!

This see-at-a-glance wall chart will save you hours of time in making up your specs. Chart shows all types of customer specifications: Navy, S.A.E., A.S.T.M., and Federal. It shows chemical composition, by percentages, of 37 alloys. Write today for your copy to:



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ZINC BASE ALLOYS • BRASS, BRONZE & ALUMINUM INGOTS • LEAD & TIN BASE ALLOYS • CADMIUM & ZINC ANODES

Circle 726 on Page 51

EUCLID CRANES

This 10-ton, 3 motor EUCLID CRANE is in operation at TEXAS ELECTRIC STEEL CASTING COMPANY

Some of the Many Foundries utilizing Euclid Cranes . . .

Crucible Steel Casting Co.
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are FAVORITES in FOUNDRIES

EUCLID thinks, designs and builds foundry cranes with dust proof mechanisms that withstand abrasive, corrosive conditions.

Push-button, rope pendant floor control and overhead cab operation incorporate the latest design improvements for precise load control at all times.

EUCLID SERIES H HOISTS are available in capacities up to 10 tons.

Write for Latest Literature

THE EUCLID CRANE & HOIST CO.
1360 CHARDON ROAD • CLEVELAND 17, OHIO

Circle 727 on Page 51

CENTRIFUGALLY CAST

AUTOMOBILE CYLINDER LINERS

DIESEL ENGINE LINERS

BRONZE BUSHINGS

on the new WATER COOLED Model M-WC
(Illustrated)

Utilizes low cost permanent molds of available steel tubing to produce gray machinable cast iron or bronze bushings. Water cooled molds can be maintained at either high or low temperature easily. High or limited production in very small space with unskilled labor. Completely safe for workmen. Simple, sturdy equipment. Quick changeover from one mold to another. Practically 100% metal yield of high quality, denser castings. Metal porosity eliminated.

Write for New Bulletin #257 Illustrating Model M-WC

RESEARCH FACILITIES

We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal castings at low cost.

Centrifugal Casting Machine Co.

P. O. Box 947 **Tulsa 1, Okla.**

Circle 728 on Page 51

No. 9-A Self-Dumping Swivel Wheel Bucket

PENN BUCKETS...

Careful balancing makes Penn Buckets self-dumping when loaded and self-righting when empty. Welded construction prevents "clinging", makes them empty easily and completely. The swivel wheel increases handling efficiency, too.

WRITE TODAY FOR NEW BULLETIN AND DIMENSION SHEET

PENN IRON WORKS, INC.

READING, PENNA.

Circle 729 on Page 51

BLASTRITE

ABRASIVES STAND UP UNDER IMPACT

The punishing impact of cleaning and peening operations calls for a metallic abrasive that can stand up and be counted.

The Blastrite line does that and more, simply because it's produced to consistently rigid specifications.

We have a small plant but we have large ideas about quality. You get guaranteed quality when you get Blastrite shot and grit.

Write for our catalog or outline your metallic abrasive requirements to our nearest representative.

Packaged the way you want it.

BUY BLASTRITE!

Steel • Pearlitic Malleable
"A" Iron • "B"
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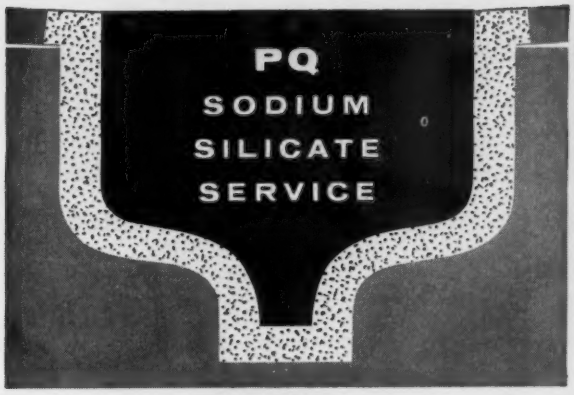

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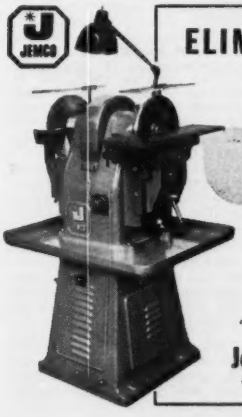

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SUPERINTENDENT OR MANAGER

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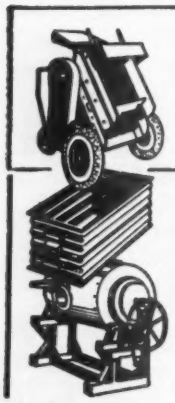

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1—36" x 42", 11½ cu. ft. Tumblast, w/loader
1—42" x 48", 17½ cu. ft. Tumblast, w/loader
1—36" x 42" air blast Wheelabrator
1—18 cu. ft. Pangborn Rotoblast Master w/loader
1—4' Swing Out Table

MULLERS
1—#1 Simpson, 4 cu. ft. cap.
1—#2 Simpson, 14 cu. ft. cap.

SWING GRINDERS
1—7½ H. P. Mummert-Dixon
10—10 H.P. Mummert-Dixon Model 1814
3—25 H.P. Safety Grinding Wheel Model 204

ELECTRIC FURNACES:
1—80 lbs. Detroit Rocking
1—350 lbs. Detroit Rocking

ASK FOR OUR COMPLETE LISTING — GLENVILLE 1-1222

CLASSIFIED ADVERTISING

For Sale

FOR SALE

1—Simpson #0 Muller—Style M (never used).
1—Lancaster Stainless Steel Counter-Current Batch Mixer, Type LW-62.
1—Lancaster Mixer, Model EBG-4.
1—Lancaster Mixer, Model EAG-3.
1—Ingersoll Rand Air Compressor, Type PRE-2, 24" x 16", 100# pressure with 300 HP motor.
3—Link Belt Roto-Louver Rotary Dryers, Models: 207-10; 310-16 and 502-20.

R. GELB & SONS, INC.
U. S. HIGHWAY 22, RAHWAY VALLEY R.R.
UNION, NEW JERSEY

FOR SALE

1—HUTCHINSON SHELL MOLDER-Model 1424. Slightly used, in excellent condition.
1—REDA FURNACE-Model 1000, like NEW, never used.

McBRIDE & SHOFF, INC.
METAMORA, ILLINOIS

FOR SALE

Thermex Tunnel High Frequency drying unit manufactured by the Girdler Corporation, Louisville, Kentucky. Model GOCA for operation on 440 volt, 3-phase power. Autotransformer available for operating at 220 volts. Machine has had little usage and is suitable for drying molds. Address: BURGESS CELLULOSE COMPANY, FREEPORT, ILLINOIS.

FOR SALE

2—Lindberg Radiant Fired Electric Furnaces complete with controls, 440 V, 50 KW. Address: ALUMINUM MATCH PLATE CORP., 1500 MILITARY RD., BUFFALO 17, NEW YORK.

For Sale

ROTOBLAST

Pangborn, Model ES-223, 4-position, complete with motors, component parts and installation prints. On skids. Original cost approximately $20,000. For quick deal FOB cars $3500.00.

GENERAL MACHINERY & EQUIPMENT CO., INC.
809 WOODLAND AVENUE
KANSAS CITY 6, MISSOURI

FOR SALE

MOTORS—GENERATORS
TRANSFORMERS

Unused—Rebuilt
WORLD'S LARGEST INVENTORY

ELECTRIC EQUIPMENT COMPANY
Phone station Collect GLenwood 3-6783
P.O. Box 51—Rochester 1, New York

FOR SALE—PIG MACHINE

Conveyor type motorized pig machine. Pour 25-40# steel pigs. Details on request.

CRUCIBLE STEEL CASTING COMPANY
2850 SOUTH 20TH STREET
MILWAUKEE 15, WISCONSIN

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

For Sale

SAND BLAST EQUIPMENT
SELL-BUY-TRADE
GUARANTEED MACHINES
TERMS: 3 YEARS TO PAY

$10,000 stock of new Pangborn replacement parts for 6 & 9 LG-14 Table Blast priced 25% less list. Send us list of parts wanted.

9' LG-14 Pangborn Table	$4500.00
6' LE Pangborn Air Table	800.00
Pangborn 53 EN2 Hand cabinet	325.00
Pangborn Auto Peening cabinet	1100.00
48 x 48 Wheelabrator Tumblast	5000.00
42 x 48 Wheelabrator Tumblast	1500.00
27 X 36 Wheelabrator Tumblast	2750.00
15" Continuous Wheelabrator Tumblast	1000.00
8' Wheelabrator Table Blast	2000.00
6' Wheelabrator Table Blast	3000.00
7GK2 Pangborn Rocker Barrel	2000.00
14 LG5 Pangborn Rotoblast Multi-Table w/5—5' tables	9000.00
Pressure Tanks, all types	150.00 up
Vapor Blast cabinets	400.00

All types and sizes of Hand Cabinets, Dust Collectors, Pressure tanks, Rooms, Horizontal or Vertical Tumbling Barrels and additional Sand Blast Equipment too numerous to mention.

DIAMOND SALES, INC.
5654 W. Jefferson
Detroit 9, Michigan
VI-36750

We will Buy one piece or your entire plant; or represent you at any auction at a savings to you.

ELECTRIC *Melting Furnaces*

LARGEST STOCK IN THE COUNTRY

ELECTRIC MELTING FURNACES—3 PHASE

SWINDELL 9' Dia. Top Charge cap. 3 ton steel 5 ton iron per hour, 3500 KVA 13800 volt transformer, complete in place.
1—"LECTROMELT" 2 TON Size Q 4000# per hour 1500 KVA 13200 volt.
1—"LECTROMELT" Size S 1000# per hour, 500 KVA 7200 volt.
1—"LECTROMELT V" 2-300# capacity per hour 220 volt primary.
LECTROMELT 500#, Size T, 300-375 KVA, 2300V primary, Moore controls, G.E. circuit breaker.

ELECTRIC MELTING FURNACES—SINGLE PHASE

1—DETROIT Rocking Type "LFY" 700# cold charge 7200 volts
1—DETROIT "LFC" 700# & 350# Tapered Shell 2300 V.
2—DETROIT "LFC" 350# Tapered shell 7200 V.
1—DETROIT "LFA" 350# shell 13200 V.

NONFERROUS FURNACES

1—HEVI-DUTY HD-181-S Pot type Electric

HEAT TREATING FURNACES

HOLDEN #202 Electrode Type, Bright hardening annealing 1850°
DESPATCH DT36 Pit type 42" x 40" Electric

FURNACE TRANSFORMERS

1—"LECTROMELT" 800 KVA, 12000 V., 3 phase
1—WESTINGHOUSE 2500 KVA, 11200 V., 3 phase
1—WESTINGHOUSE 2500 KVA, 13800 V., 3 phase

ACME

ACME EQUIPMENT CO., INC.

We will buy for cash a single piece of equipment or your entire plant

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ANOTHER "BLUE CHIP" FOUNDRY LIQUIDATION

CLEVELAND FOUNDRY CO.
DIVISION OF TEXTRON, INC.

MOLDING MACHINES

35—SPO #113J Jolt Squeezers
33—SPO #110J Jolt Squeezers
15—OSBORN #276J Jolt Squeezers
16—OSBORN #275J Jolt Squeezers
4—OSBORN #710 Jolt Squeeze Pin Lifts
4—OSBORN #712J Jolt Squeeze Pin Lift
1—TABOR 30 x 40 Jolt Rollover Pattern Draw
2—SPO #413 Jolt Squeeze Rockover Draw
2—OSBORN #559 Jolt Pin Lift
4—INTERNATIONAL Type G Jolt Roll-over Pattern Draw, various sizes
5—OSBORN #601 Jolt Rollover Pattern Draw
4—OSBORN #602 Jolt Rollover Pattern Draw
2—INTERNATIONAL Model JDP, 1200# Jolt Pin Lift
1—INTERNATIONAL Model JDP, 1600# Jolt Pin Lift
2—JOHNSTON & JENNINGS 12" cylinder Jolt Squeeze
2—JOHNSTON & JENNINGS #612RBP Jolt Rollover Pattern Draw
2—OSBORN #42 Core Rollovers
2—OSBORN #40 Core Rollovers

SAND MULLERS & MIXERS

1—SIMPSON #1 Style H, with dust hood & loader
1—SIMPSON #3 Style UD, with automatic controls
1—BEARDSLEY & PIPER #40, Air Cooled with dust hood
3—BLYSTONE Model BI Mixers, 7 cu. ft.
1—DRAVO DOYLE Mixer on Pneumatic tires
1—KNICKERBOCKER Cement Mixer, Portable

SAND HANDLING EQUIPMENT

2—NEWAYGO Model HS7GT Twin Hopper Handy Sandys
2—NATIONAL 24" x 20' Belt Conveyors
2—NATIONAL Bucket Elevators, 14 x 7" Bucket, 34' high & 60' high
2—LINK BELT 5' x 10' Shakeouts
1—LINK BELT 48" x 230' centers Leak-Proof Hot Castings Conveyor
1—NATIONAL 24" x 30' Magnetic Belt Conveyor
1—NATIONAL #C-3 Aerator
3—LINK BELT 30" width Oscillating Conveyor—used in tandem, total 250'
1—FARQUHAR Portable Conveyor, 12" x 15' long
2—FARQUHAR Undercar Unloaders, 18" x 30' centers
1—JEFFREY Bucket Elevator, 65' high
1—JEFFREY #5 Vibrating Feeder, 24" x 9'

MATERIAL HANDLING EQUIPMENT

1—EUCLID 40' span, 3 ton Crane, Floor operated, AC, with runways
1—EUCLID 60' span, 3 ton Crane, Floor operated, AC, with runways
12—INGERSOLL RAND Air Hoists, 500, 1000, & 2000 lbs. capacity
6—THOR AIR Hoists, 2000 & 4000 lbs. capacity
4—YALE "Cable King", 1000 & 2000 lbs. capacity
1—CLARK Fork Lift Truck, 2000 lbs. capacity
1—TOWMOTOR Model LP48, 5000 lbs. capacity
6—AUTOMATIC Electric Transporters, 6000 lbs. capacity
2—HOUGH Model HA Payloaders, 12 cu. ft. capacity
1—BAKER-RAULANG with Ready Power Unit, 4000 lbs capacity
4—LOUDEN & AMERICAN Bridge Cranes with End Trucks
2000' MATTHEWS Roller Conveyor, 6", 12", 14", 20" & 22" widths
15—ROUHRA Dump Buckets, ½, ¾ & 1 cu. yd. capacity
100—Skid Boxes, 30" x 48" & 24" x 48", with 12" skids
2000' of AMERICAN Monorail with switches & turns

SAND TEST EQUIPMENT

Rammers, Permeability Meters, Rotap Riddle, Sand Strength Machine, Lab Ovens, Scales, Balances, Pyrometers, etc.

MELTING EQUIPMENT

1—WHITING #6 Cupola with Modern Bucket Type Charger & Toledo Scale, 40 HP Ingersoll Rand Cupola Blower
2—ROOTS Positive Cupola Blowers, 50 HP synchronous motors & controls
2—FOXBORO Controllers—new
4—MODERN Geared Ladles, 1000, 1200, 2000 & 3000 lbs. capacity
3—MODERN Pouring Devices with Ladles
12—MODERN 1-ton Ladles, covered, with hand tilting device
1—REDA Size 550 Melting Furnace
1—STROMAN Dip-out Model DC Reverb Furnace, 1000 lbs. capacity
1—ECLIPSE Model E-1000 Reverb Furnace, 1000 lbs. capacity
1—INGERSOLL RAND Cupola Blower, 40 HP motor
1—INGERSOLL RAND Cupola Blower, 85 HP motor
1—BONDACTOR Model 1250L Cupola Lining Gun

SAND PREPARATORS

5—BEARDSLEY & PIPER Model S, M & L Screenerators
1—NEWAYGO Reddy Sandy, Model RSVM with mag. pulley
1—ROYER Scrap Control Unit, Model S-522-9M
4—AMERICAN Sand Cutters, Model AA & AM
2—MOULDERS FRIENDS, 50" & 60" Brush Length
1—AMERICAN Sand-Master Sand Cutter

CLEANING EQUIPMENT

1—AMERICAN WHEELABRATOR Tumblast, 42" x 48", new 1953, with or without Loader
1—AMERICAN Tablast, Model 1A, 4' dia. table
5—AMERICAN WHEELABRATOR & PANGBORN Dust Collectors, various capacities & sizes
2—TESSMER Sprue Cutters, Models H & I
3—SLY Tumbling Barrels, square type, 42" x 42" x 48" long
6—SLY Tumbling Barrels, square type, 36" x 36" x 42" long
6—SLY Tumbling Barrels, round, 20" dia. x 42" long
6—SLY Tumbling Barrels, round, 30" dia. x 42" long
12—SLY Tumbling Barrels, round, 24" dia. x 48" long
2—MARSCHKE Swing Grinders, 10 HP & 15 HP
7—MARSCHKE, U. S. & SAFETY-RITE Snag Grinders, 7½, 10, 15, 20 & 25 HP, Wheel sizes from 14" x 2" to 30" x 12"
2—GARDNER Vertical Disc Grinders with work tables, 18" & 24" wheels

500 HINES & FREMONT Slip & Pop-off Flasks & approximately 1000 Jackets with Boards

CORE ROOM EQUIPMENT

9—DEMMLER #1 Core Blowers with clamping
11—DEMMLER #2 Core Blowers with clamping
3—REDFORD #1 Core Blowers with clamping
100—Core Racks—new
2—Core Belt Conveyors, 20" wide x 120' centers
1—LANLEY Single Compartment Core Oven, recirculating
2—Speed-Sifter Riddles
1000—Aluminum & Transite Core Plates
1—LEWIS Automatic 1-C Core Wire Straightener & Cutting machine
6—LEWIS SHEPARD Hydraulic Platform Lift Trucks
1—KANE & ROACH Core Wire Straightener, Model DX-5
1—STONEY Core Grinder
1—AMERICAN Model H Core Rod Straightener & Shear
1—SPO Shell Core Blower Model SC-10-DM
1—SHALCO Model P-5 Shell Core Machine

MACHINE TOOLS

1—DO-ALL Band Saw, V-36
1—NIAGARA Sheet Metal Hand Brake
9—CRAFTSMAN Drill Presses
4—WALKER TURNER Drill Presses
2—WALLACE Band Saws
1—TOLEDO Power Hack Saw
1—JARVIS Portable Grinder
1—FRANK H. LEE Planer, 14" x 36"
4—Hand Arbor Presses
1—SOUTH BEND Bench Lathe
3—Surface Plates

MISCELLANEOUS

200—Doors of Clothes Lockers—new
1000—Flask Weights
5000—Aluminum & Wood Bottom Boards
3000—Flask Bars
50—Air Tools, Rammers, Grinders & Chippers
5—Man Cooling Fans
8—Time Clocks
6—SUN-ROC Electric Drinking Fountains
2—ECONOMY Paper Balers
2—Embossing Machines
75—Vibrators
15—Speed Reducers
30—Electric Motors
2—Motor Generator Sets
9—Hand Trucks
12—Barrel Trucks
30—Wheelbarrows
25—Parts Bins
4—TOLEDO & FAIRBANKS-MORSE Platform Scales, from 1000 to 6000 lbs. capacity
2—ELECTRIC Battery Chargers, MG type
1—WHITE Stake Body Truck, 2-ton capacity

OFFICE EQUIPMENT

1—ADDRESSOGRAPH Plate Maker
1—ADDRESSOGRAPH Printer
4—FRIEDEN Calculators
3—ROYAL Typewriters
15—Filing Cabinets
12—Desks & Chairs
4—Tables
6—Cardex Files
8—Time Clocks
5—Air Conditioners, ¾ ton

AIR COMPRESSORS

2—INGERSOLL RAND 2-stage water cooled, horizontal with 100 HP motors & controllers

Sale Under Management of Liquidating Division

AAA MACHINERY & EQUIPMENT CO.

DIRECT ALL INQUIRIES TO 2818 HARVARD AVE., CLEVELAND, OHIO

PHONE MI. 1-1777 REPRESENTATIVE ON PREMISES

THE ACME BARGAIN PAGE

AIR COMPRESSORS
2—INGERSOLL RAND 450 cfm., 100 hp., 220-440 V.
1—CHICAGO PNEUMATIC 225 cfm., 50 hp., 220-440 V.

BELTING
29" x 180' 24" x 152'
24" x 263' 24" x 120'

BLOWERS
GE 10500 cfm., 20 oz., 85 hp., 220 V.
GE 7500 cfm., 20 oz., 89.6 hp., 220-440 V.
GE Centrifugal 6200 cfm, 24 oz., 58 hp. motor
WHITING-ALLIS CHALMERS 5750 cfm., 28 oz., 60 hp., 440 V.
WHITING-SPENCER 5600 cfm., 32 oz., 75 hp., 220-440 V.
INGERSOLL-RAND 4000 cfm., 60 oz., 100/25 hp., 220-440 V.
SPENCER 2250 cfm., 16 oz., 15 hp., 220 V.
SPENCER 2850 cfm., 16 oz., 20 hp., 220-440 V.
SPENCER 270 cfm., 8 oz., 3 hp., 220-440 V.

CONVERTERS—MOTOR GENERATORS
1—100KW WESTINGHOUSE 250 V. DC. 400 AMP. 220 V. Crocker Wheeler controller and panel.

CONVEYOR OVERHEAD CHAIN
1700' JERVIS B WEBB and LINK-BELT #678 with trolleys 36" centers. 2-5 hp. Variable speed caterpillar drives, & motor generator set, takeups and turns.

CONVEYOR
36" x 162' LINK BELT Oscillating Pan 10 hp., 220-44C V.
36" x 53' LINK BELT Oscillating pan.
17' BARBER GREEN Bucket Conveyor.
30" x 25' Magnetic Belt Conveyor w/drives, 2 hp., 220-440 V.
18" x 10' Steel Apron Conveyor w/drives, 3 hp., 220-440 V.
16" x 120' Rubber Belt w/drives.

CORE BLOWERS
CHAMPION CB400 up to 300# cores, 6½" draw.
2—CB15 up to 55# cores, Universal blow plate
C.B. 10 up to 12# cores, 4½" draw.
DEMMLER #4 up to 250# cores.
DEMMLER #3 up to 35# cores.
DEMMLER #2 up to 20# cores.
INTERNATIONAL SB15H, up to 150# cores, Hydraulic clamp and draw
INTERNATIONAL SB 13, up to 60# cores
INTERNATIONAL SB 12, medium sized cores
INTERNATIONAL SB 11, medium sized cores
OSBORN 193 up to 50# cores
OSBORN 2035-2 large sized cores
REDFORD Bench types, horizontal or vertical clamping

CORE DRAW
SPO CD 36 14" x 41" rollout table.

CORE GRINDER
MILWAUKEE 70-12, 70" dia. table
6—MILWAUKEE 70-9, 70" dia. table
1—OWOSSO DE1-303 42" table

CORE OVENS INDUCTION
THERMONIC 1800A cap 2000# hour

CORE OVENS TOWER
COLEMAN Vertical-Horizontal 9000# per hour
COLEMAN Vertical-Horizontal 6800# per hour

CORE PASTE OVENS
COLEMAN 28' Horizontal

CORE ROLLOVERS
INTERNATIONAL REDP Rollover 12" draw

CRANES
P&H 5 TON Electric Traveling DC motors 50' span
P&H 3 TON Electric Traveling DC motors 50' span
270' Crane Runway and Supports
10 Ton AMERICAN Railmaster Low headroom floor control
10 Ton SHAW BOX electric hoist

JUST RECEIVED
FISHER—GAS FIRED FURNACES
2—400# Tilting Furnaces
4—600# Tilting Furnaces
1—600# Tilting Furnace

CRUSHER—PULVERIZER
STEDMAN 12" x 12" 4/10 hp 3/60/220-440 V motor

CUPOLA GUNS
2—BONDACTOR #1250
BONDACTOR #1000

DUST COLLECTOR
PARSONS 40,000 cfm. cloth bag type

FEEDERS
3—SYNTRON Vibra Flow Feeders F4100, w/controllers

FLASK SECTIONS STEEL
42—27½" x 48" x 8⅛" high
26—39⅛" x 53⅛" x 9" high

FURNACES NONFERROUS
STROMAN 1000# Oil fired, hydraulic tilt.
CAMPBELL HAUSFELD Staty, pot type
FISHER RB100 gas fired crucible

GRINDERS, SNAG
FOX 24" x 2" Single Wheel 10 hp.
2—HAMMOND 20" DE 10WR1 10 hp., 220-440 V.
1—HAMMOND 20" DE Porter Cable backstands 10 hp.
1—HAMMOND 24" x 2" x 12" 7½ hp., 220 V.
HAMMOND WR-2, 2 speed, 30" x 3" wheel

GRINDERS, SWING FRAME
MARSCHKE 24" x 3" x 12" 20 hp., 220 V.
U.S. 24" x 3" x 12" 15 hp., 220-440 V.
U.S. 20" x 2⅛" x 6" 10 hp., 220-440 V.

GRINDERS, MISC.
PORTER CABLE BG8 Wet-Dry Belt
U.S. #70 Combination 20" disc and 20" x 3" x 1½" wheel

HOISTS
YALE 5 TON floor control power travel
SHAW BOX 5 TON floor control Hand travel
4—INGERSOLL-RAND Air trolleys
1—500# INGERSOLL RAND LC-4
4—CLEVELAND 2000# Cab type hot metal carriers

LADLES
1—6000# Industrial Enclosed Geared Crane
1—5000# Modern Enclosed Geared Crane
3—2125# Industrial Enclosed Geared Crane
1—2000# Whiting Enclosed Geared Crane

LADLE MIXING
4000# Industrial, Insulated

LADLE HEATERS
2—NORTH AMERICAN Flexible hose.

MOLD BLOWER
TACCONE TD4 24" x 32" flask

MOLDING MACHINES JOLT SQUEEZE PIN LIFT
2—MILWAUKEE 125-3-21" x 27" Table 8" draw.
7—OSBORN 712 PJ, 18" x 21" Table
1—CHAMPION JSL10P 18" x 21" table 6" draw.

JOLT SQUEEZERS
2—INTERNATIONAL, LJS12 16" x 20" table
1—SPO, 110J Portable 17" x 20" table
4—CHAMPION, JS10P 18" x 21" table
2—OSBORN 275PJ

JOLT ROLLOVER DRAWS
4000# HERMAN, 36" x 60" table
3000# HERMAN, 52" x 84" table
1500# HERMAN, 26" x 48" table
2—1000# TABOR, 30" x 51" table, portable
3—#22 DAVENPORT
1020 JOHNSTON & JENNINGS, 60" x 50" table
JOHNSTON & JENNINGS 918, 44" x 64" table, 20" draw, rollout table
2—750# HERMAN 20" x 30" table
20 x 8" INTERNATIONAL type G, 20" x 30" table
2—INTERNATIONAL RJ 20 x 12"

JOLT PIN LIFTS
3—INTERNATIONAL 1200-3 26" x 27" table 3" draw
1—INTERNATIONAL 26" x 36" table, 8" draw

JOLT SQUEEZE FRAME STRIP
#814 OSBORN 14" x 30" Pattern space.
2—331 OSBORN

PIN LIFT PUSHOFF
CHAMPION 28" x 42" table
MILWAUKEE 620ND 20" x 24" table

MULLERS and MIXERS
1—#2 SIMPSON Unit Drive
2—#1 SIMPSON Mullers
1—WONDER "HOE BOY" 3-4 cu. ft.

POLISHING MACHINES
MARSCHKE 6 Station Roto-Mat 5-heads.

RIDDLES
2—B&P CHAMPION 200# per min.
1—UNIVERSAL 20"

SAND CUTTERS
1—SCREENARATOR MODEL "S"
1—ROYER MCZ-43

SAND SLINGERS
2—B&P Tractor 19" heads
B&P 2 speed 40/25 HP double belt
B&P Plate Feeder, 5 ton

SAWS, BAND
30" LAIDLAW, Metal Cutting hydraulic feed
32" CRESCENT, 2 hp., 440 V.
30" TANNEWITZ, 3 hp., 440 V.
42" TANNEWITZ, 5 hp., 220-440 V.
6" x 6" RACINE Oil Cut Hack Saw

SAWS, CUTOFF
DEWALT ME-1 16" Blade 5 hp.
DEWALT ME-3 Abrasive cutoff 18" wheel
DEWALT GF 14" wheel 3 hp. 220-440 V.
DELTA Abrasive cutoff

SCALE
FAIRBANKS PRINTOMATIC 6250#

SCREENS
3' x 8' SIMPLICITY

SHAKEOUTS
3' x 5' SIMPLICITY
5' x 6' SIMPLICITY
5' x 10' LINK BELT

SPRUE CUTTERS
2—PERKINS #53 1¼" stroke
1—MILWAUKEE #85 TON

TESTING EQUIPMENT
ARLIN Automatic Rockwell, continuous type
COLEMAN 55 Spectrophotometer
BALDWIN SOUTHWARK 20,000 Tensile Tester w/load indicator and recorder

TUMBLING BARRELS
2—ROYERSFORD, 42" x 72", chain drive, late
WHITING 60" x 72" 20 hp. drive
SLY 42" x 42" x 64" 10 hp.
SLY 42" x 42" x 56" 5 hp.
SLY 36" x 72" 7½ hp.

WHEELABRATORS
2—42" x 48" AMERICAN Skip Loader
1—27" x 36" AMERICAN Skip Loader
1—20" x 27" AMERICAN Rubber Belt

WOODWORKING—PATTERNSHOP
GARDNER 30" DISC and Spindle Sander
JONES SUPERIOR 48" Double Disc.
OLIVER 72DR Router or borer
PORTER 24" Facing Planer
BOICE CRANE 12" Planer
HESTON ANDERSON Swing Saw #5
DELTA 10" UNISAW
OLIVER Patternmakers Vises
NORTHFIELD #4 Tilting Arbor Saw
OLIVER 20A Pattern Lathe 16"

WIRE STRAIGHTENERS
AMERICAN type H rod ⅜"-⅝" cap.
2—#2A CLIMAX ¼"

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ACME EQUIPMENT CO., INC.

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MONA

UNIVERSAL REBUILT EQUIPMENT GUARANTEED

AIR COMPRESSORS
COMPLETE STOCK—BURY, PENNSYLVANIA, SULLIVAN, INGERSOLL-RAND —SEND YOUR REQUIREMENTS

BLOWERS
25—CENTRIFUGAL 16 oz., 2 to 5 HP
10—GE, WILBRAHAM-GREEN, FISHER Positive Pressure & Cent, Cupola Blowers

CLEANING EQUIPMENT & TUMBLING BARRELS
1—AMERICAN #1 MULTITABLE TABLAST, 17" Table
1—AMERICAN 48" Swing Table
1—AMERICAN 15" x 20" WHEELABRATOR TUMBLAST, w/dust collector
1—AMERICAN 27" x 36" WHEELABRATOR TUMBLAST
1—AMERICAN 36" x 42" WHEELABRATOR TUMBLAST
1—AMERICAN 42" x 48" WHEELABRATOR TUMBLAST, w/loader
1—15" Continuous AMERICAN TUMBLAST 4 tons per hour capacity
1—AMERICAN 36", Continuous WHEELABRATOR, side discharge, two head, Serial #A95643, New 1953. Used 2 months
1—PANGBORN 6' TABLE-ROOM, Type LK.
1—PANGBORN TABLAST, 8' Table
1—WHITING 36" x 72" Round w/gear head motors & brakes
1—SLY, Twin Unit, 40" x 24" Round, 10 HP
1—SLY, 68" x 32" Round
10—WHITING 36" x 36" x 72" w/gear head motors & brakes

CONVEYORS
1—HEWITT ROBINS Vibrating, 18" x 10'
1—JEFFREY, 3 compartment, ingot mold
1—LINK BELT, vibrating, double deck, 80' x 24", w/exhaust hood
1—LINK BELT, CAR type mold, 114 cars, 403' track, car size 18" x 42"
2—LINK BELT, 30" Steel Apron Conveyors, 100' Centers
4—SAND ELEVATORS, Various sizes
6—SAND BELTS, 10' ctrs. to 140' ctrs.
2500 FEET—FOUNDRY TYPE ROLLER CONVEYOR—ALL SIZES

CORE BLOWERS
1—CHAMPION CB-12
10—DEMMLER #1, #2, #2A, #2K, #3K, #4E
3—INTERNATIONAL SB-13
3—OSBORN #91, #192, #91-10.
1—RANDALL, MODEL "A", Bench Type
1—TACCONE #4D, 10" Draw Stroke Cyl.

CUPOLAS
1—MORRIS #9, Skip charger, Blower, Mixing Ladle, Never Installed
1—SKIP CHARGER for #9 Cupola with scale and buckets
1—WHITING Skip Charger for #5 Cupola

DUST COLLECTORS
1—AMERICAN WHEELABRATOR, Model #115KD, 20' L x 9' W x 9' H
10—ROTOCLONE #12, Type N, #14D, #16W, #20D, #24W, #30W

FURNACES—DIRECT ARC MELTING
1—250 Lb. LECTROMELT, Side Charge
1—3,000 #/hr. LECTROMELT
1—3000 # HEROULT
1—6 Ton HEROULT

FURNACES—INDIRECT ARC
1—10 # DETROIT Lab Type
1—350 # DETROIT LFA
1—500 # DETROIT, LFN, Hydraulic
1—750 # DETROIT LFY, Conical Shell
1—1500 # DETROIT AA, 300 KVA
1—3000 # DETROIT C, 500 KVA

FURNACES—INDUCTION MELTING
1—3KW, AJAX, Lab type
1—20 KW, AJAX SPARK GAP, High Frequency
2—150 KW AJAX, Brass Melting
1—50 KW AJAX 100 # Cap. MG set.
1—333 KW AJAX 1000 #

IMMEDIATE DELIVERY
3 Ton Top Charge
SWINDELL ARC FURNACE
Unit is in Excellent Condition, Dismantled, ready for Immediate Delivery.

FURNACES—GAS & OIL
1—FISHER MNP, Gas Tilting, 1700 # cap. Mag.
2—FISHER, Gas, Stationary, 4 Burner, 500 # cap.
3—HAUSFELD, Stationary, Gas, 250 # to 1000 # capacity
1—HAUSFELD, Tilting, 1200 # capacity
1—STROMAN, Gas Tilting, 1000 # cap. Alum., auto control hyd. lift

FURNACES—HEAT TREAT
1—2' x 3' x 6' deep, gas fired, 1800°F.
1—20" x 24" deep, L&N Homocarb electric
1—20" x 36" L&N Draw electric
1—5' x 8' LEE WILSON Pit Type electric

GRINDERS
1—5 HP CINCINNATI, 2/60/110
1—5 HP GARDNER, 12" x 2½" wheels
1—7½ HP U. S. 2300-8400 RPM, 14" x 2" wheels
1—7½ HP U. S. 3/60/220, 20" wheels
1—7½ HP U. S. Model 66, 14" x 3" wheels
1—10 HP U. S. Model 65, 20" x 3" wheels
3—10 or 15 HP SWING FRAME, 22" wheels.

MOLDING MACHINES
Jolt Rollover Pattern Draw
1—J & J #1020, 50" x 60" Table, 3000 #
2—J & J #918, 44 x 54 Table, 20" draw
1—J & J #815, 30" x 40", 15" draw, 1200 # jolt
2—HERMAN 10,000 #, 48" x 109" table
1—HERMAN 6000 #, 50" x 72"
1—HERMAN 3000 #, 30" x 66" Table
2—HERMAN 1500 #
1—HERMAN 750 #, 30" x 36"
2—INTERNATIONAL, 13" x 17" table, 6" draw
1—MILWAUKEE #217, max. flask 41" x 35", 21" cyl., 1200 # jolt cap. Jolt Squeeze Pin Lift
1—OSBORN #716PJ, 22" x 34" table, 1250 # Jolt Squeezers
1—OSBORN #602, 36" x 26", 900 #
1—OSBORN #405, 3000 #, flask size 64" x 50", 18" draw
1—OSBORN #42, 15" x 20", hand draw
2—SPO #110J, 17" x 20" table, port.
4—TABOR 40" x 60", 1500 & 3000 # capacity
2—TABOR, 30" x 40" w/air clamps, 1000 #
1—TABOR 22" x 42", pattern draw, shockless, portable
1—TABOR, 20" x 30" w/air clamps, 1000 #
2—TABOR, 14" x 16" Rockover.

Plain Jolt
5—DAVENPORT, table sizes 24" x 27", 30" x 30", 1200 # to 1800 #
1—OSBORN #102
1—SPO #5SP, 18" x 28" table, 800 #

Jolt Pin Lift
1—HERMAN #4317, 22" x 30" table
1—J & J #681-C, 30" x 25" table, 600 #
1—MILWAUKEE #1535, 32" x 38", 1500 #
1—OSBORN #559, 25" x 30" table, 6" draw, 1200 #
3—SPO #305, #307, 750 lb., 1500 lb.
1—TABOR, 17" x 20" table, portable
1—TABOR, 20" x 20" table, hand strip
1—TABOR, 20" x 24" table, 600 #

Jolt Squeeze Pin Lift
2—INTERNATIONAL, PKL, 18" x 24" table, 12" sq.
1—MILWAUKEE #126, 21" x 27" table, 12" sq., 1200 #
2—MILWAUKEE #163, 15" x 24" table, 11" sq.
5—OSBORN, #712J, #712PJ, 18" x 28" table, 12" sq.
5—SPO #2114P, 21" x 27" table, 600 #
2—SPO #2136G, 21" x 30" table, 800 #.

Jolt Squeezers
4—INTERNATIONAL #10 LJS, 17" x 20"
1—MILWAUKEE #104-5JS, 17" x 21", port.
1—NICHOLS #12 F-P, portable, 600 #
31—OSBORN #275J, #275PJ, 17" x 20" tables, 10" sq., 400 #.
8—TABOR, 3" jolt, 17" x 20"

MATERIAL HANDLING
1—BYERS, Mobile Crane, BUDA Engine, 50' Boom, 5 ton w/magnet & bucket
1—CLARK, Fork Lift, Gas, 3,000 lb., capacity, Solid Tire

MULLERS AND MIXERS
1—B&P #70 Speedmullor, 6'5" Dia., 15 cu. ft. batch
1—B&P #40 Speedmullor, 5 cu. ft. batch
1—B & P, Conventional, SIMPSON type, 87½" Dia., arranged for cooling
1—B&P #3½ Mulbaro
2—LANCASTER Mixers, #4, 5' Dia. Pan, 3-9 cu. ft. cap.
1—MULLER Plaster & Mortar Mixer, 3 cu. ft. batch, Pneumatic Tires
5—SIMPSON #0, U, D, 3' Dia., 175 lbs.
1—SIMPSON #1½ Style UD, 4'6" Dia., 6 cu. ft. batch
1—SIMPSON #2, 6' Dia., 14 cu. ft. batch
1—SIMPSON, #3, 8' Dia. Unit Drive, with loader 20-25 cu. ft. batch

LADLES AND POURING DEVICES
Bottom Pour
1—MODERN Crane Type, 54" H x 39" top
2—MODERN Crane Type, 55" H x 50" top
1—MODERN Crane Type, 60" H x 50" top

Lip Pour
1—WHITING 42" x 42" top dia., geared

Cylindrical
8—WHITING, 28" L x 25" dia., 1100 # iron
7—WHITING, 19" L x 25" dia., 600 # iron
3—WHITING, 38" L x 28" dia., 2200 # iron

Pouring Devices
7—WHITING, 850 # to 2000 # gross cap.

OVENS
1—ALLIS CHALMERS Dielectric Core Oven, Type FCD-100
1—COLEMAN, OIL, one compartment, recirc., 60" W x 80" H x 14'6" L
1—COLEMAN, Gas, 2 Comp. and 5 drawers, OD. 22" x 12' x 10'
3—GENRICH, elec., 3 drawer, preheating, auto-control, 9' H x 8' W x 6'7" L.
2—ROSS, Gas, 2 compartment, recirc., rack type, 6½' x 14' x 7'

SAND CONDITIONING
2—B & P Screenarator, Model "M"
1—JEFFREY Sanditioner, Portable, 10-15 tons/hour, 2 H.P. Motor
1—NATIONAL ENGINEERING SAND-PREPARATOR Unit w/permanent magnet pulley
1—ROYER PREPARATOR, Comb. Model NDC, 25 Ton/hr. Scrap removal, 8' x 8' hopper
2—ROYER, NDP 15-25 tons/hr., 2 HP Motor
2—ROYER, NC-2, 10-15 tons/hr., 1½ HP Motor

SAND CUTTERS
1—AMERICAN, 15 HP, 96/78 Reel
1—AMERICAN, 10 HP, 48" Reel

SAND SLINGERS
2—B&P Tractor Type, 19" head, 4" tip, w/mag. separator, New 1947

SHAKEOUTS AND SCREENS
1—HEWITT ROBINS, Vibrex screen, 3' x 8'
3—SIMPLICITY, 3 x 8, 5 x 8, 8 x 10.

MISCELLANEOUS
1—HOWE WEIGHTOGRAPH SCALE, Model 1700
1—KANE & ROACH WIRE STRAIGHTENER, Model DX-5
1—PATTERSON-KELLEY Twin Shell Dry Blender, 3 cu. ft. capacity
FLASKS, CORE PLATES, All Sizes

UNIVERSAL MACHINERY AND EQUIPMENT CO.

1632 N. Ninth St., Reading, Pa. **Phone: FRanklin 3-5103**

Send for Our FREE Catalog

AAA MACHINERY & EQUIPMENT CO.

over 1000 satisfied customers

WORLD'S LARGEST INVENTORY OF GUARANTEED FOUNDRY EQUIPMENT

AIR & ELECTRIC HOISTS

15—DETROIT Air Hoists, 1, 1½, 5 ton cap.
2—P&H and DETROIT Model LHR, 5 ton.
20—THOR air hoists, ¼, 1 & 2 ton cap.
85—INGERSOLL RAND Air Motor Type. Sizes RC-5, A, B, C, D-6, ¼, ½, 1 and 3 ton capacity.
4—KELLER 1 ton capacity air hoists.
1—SHAW BOX 2 ton load lifter.
2—YALE ½ ton.

BUCKET ELEVATORS

12—LINK BELT & JEFFREY, 30, 40, 50, 60 ft. cc, 10 x 7, 12 x 7, 14 x 7 buckets.

CUT-OFF MACHINES

2—AMERICAN H-Rod Straighteners.
1—DeWALT ME 2, 10 HP, 24" Blade.
1—GROB Band Saw, Type OS-36.
TABOR C10AF—18" wheel, 10 HP.
3—TESSEMER H & I Sprue Cutters.

CORE BLOWERS

3—CHAMPION Model CB-10, CB-18, & CB-400. From 10 to 300 lb. Cores.
22—DEMMLER Model Nos. 1, 1E, 2, 2E, 2K, 3, 3E, 3K, 4, & 4E. From 10 to 100 lb. Cores.
7—INTERNATIONAL Model 8B-11 & 8B-13, 8B-15H, 15 to 30 lb. Cores.
6—OSBORN Nos. 91, 92, 192 and 193. From 10 lb to 75 lb. cores.
3—MILWAUKEE #3A Bench Type.
1—SPO Model SC-10-DM Shell Core Blower.
1—SAN-BLOW, Model CB-40-B, 40# Cores.

CORE OVENS

4—CARL MAYER 2-Compartment, oil fired, I.D. 7' W x 14' deep x 8' H each.
1—INDUSTRIAL "Revolving Carriers" continuous, 18" x 80" trays.
1—THERMONIC Model M800A Dielectric. Cap. 900#s per hour.

CUPOLA BLOWERS & EQUIP.

1—SPENCER 150 HP 7500 CFM 48 oz.
6—I & R Centrifugal 30, 50, 85 and 100 HP, 3500 to 10,500 CFM w/blast gates.
1—ROOTS 7,000 CFM, 50 HP motor.
1—ROOTS CONNERSVILLE Type RCS Size 20 x 60 w/75 HP motor.
1—MODERN No. 3½ Cupola.
1—CUPOLA Bondactor, style 1250-L.
1—WHITING No. 6 Cupola.

ROTO-CLONES WET TYPE

9—AMERICAN AIR FILTER Type N&W, Sizes No. 10, 20, 24, 27, & No. 30, w/sludge ejectors, cap. to 30,000 CFM.

ELECTRIC MELTING FURNACES

1—AJAX 20 KW Induction Unit.
1—TOCCO 20 KW Induction Unit, 9600 cycles.
3—AJAX No. 100 & 300 Furnaces Only.
1—BOOTH one ton, direct arc, side charge with 1500 KVA Transformer with gear and all controls.
1—DETROIT Size CM—8000# Cold Charge w/1000 KVA transformer.

GAS & OIL FIRED FURNACES

23—LINDBERG FISHER Model MNP electric Tilting. Sizes 150, 400, 600, 1700, 2000 & 2400#, aluminum capacities. Gas or Oil Fired.
5—LINDBERG FISHER Type BBI Hand Tilting Furnaces, Sizes 100, 125, 225.
29—LINDBERG FISHER & CAMPBELL, HAUSFELD Stationary, Sizes 100, 150, 200, & 550 capacity. Gas or Oil Fired.
1—STROMAN Model JC Cradle Type Hydraulic tilt, 2000# capacity. Iron.

HEAT TREAT FURNACES

1—DESPATCH Model DT-26, 38" diameter x 26" height, gas fired recirculating, 1250°, pit type.
1—SURFACE COMBUSTION, 54" x 96", box-type, gas fired, 1850° F.

GRINDERS

Swing Frame

1—MARSCHKE 20" x 10" wheel, 10 HP.
2—FOX No. 6, 24" x 10", 15 HP.
3—MARSCHKE 24" x 3" wheel, 15 HP.
2—U. S. ELEC. Model 24, wheel 24" x 3".
1—MUMMERT-DIXON #2420, wheel 24" x 3".

Snagging

2—U. S. #64, 20" x 3", 7½ HP, 4 speed.
2—SAFETY #174, 24" x 3" wheel 10 HP.
2—MARSCHKE 24" x 4" wheel, 20 HP.
1—U. S. #65, 30" x 3", 30 HP, 4 speed.

Core

2—MILWAUKEE 70-12, 70" dia. table.
1—STONEY Core Grinder, 16" dia. Wheel.

Horizontal Disc

GARDNER No. 124—53" wheel, 20 HP

LADLES

17—MODERN & WHITING Cylindrical Ladles, 275, 1500, 2450, & 3000 lbs. capacity. All Enclosed Gears.
12—MODERN Model F-9 and FA-9 Pouring Devices, with ladles 400 to 800 lbs.
37—MODERN & WHITING Lip Pour, Enclosed Gear, 1200, 1600, 2000, 4000, 6000, 7000, 8000, & 80,000 lbs. capacity.
7—MODERN & WHITING Cylindrical Mixing Ladles, 2 & 3 ton capacities. Electric & Manual Tilting.
7—WHITING Bottom Pour 4 ton.

MUST BE SOLD

INDIVIDUAL ITEMS OR BULK
WHITING No. 9 Cupola
With Swivel type Charger Skip
Hoist type w/storage hoppers
Scales & Cone Bottom "Wish Bone" Buckets, Mixing Ladle & Blower.

MOLDING MACHINES

Jolt Squeezers

37-OSBORN, SPO, MILWAUKEE, Portable & Stationary. 10" Squeeze Cyl.
13—OSBORN, MILWAUKEE & SPO Portable & Stationary, 12" Cylinder.

Plain Jolt

1—HERMAN 40" x 58" table, 3000# cap.
1—HERMAN 8' x 12' table, 32,000# cap.
1—J&J 50 x 72 Table—5000# cap.

Jolt Rollover Pattern Draw

1—DAVENPORT 28-SA, 29" x 40" table.
2—DAVENPORT 40-SA, 42" x 50" table.
3—HERMAN 1500 lb. Series, 26" x 48".
1—HERMAN 750 lb. Series, 20" x 30.
2—HERMAN 4000 lb. Series, 40" x 60".
14—INTERNATIONAL Type G, Sizes 20" x 8", 24" x 10".
1—INTERNATIONAL RES Size 15" x 8".
2—J & J #612, 24" x 30" Table.
4—J & J #918, 44" x 54" Table.
1—J & J #815-B, 30" x 40" Table.
1—MILWAUKEE #167, 32" x 33" Table.
1—MILWAUKEE #60B-3, 60" Flask.
10—OSBORN #40 and 42 Core Rollovers.
1—OSBORN #442, 21" x 31" Table.
2—OSBORN #242W, 29" x 42" Table.
12—OSBORN #601 & 602, 30" & 36" Wide Flask, 10" draw, 750 lbs. Cap.
2—OSBORN 643—Table 35 x 50—2000# cap.
1—SPO #413D, 24" x 25" Table.
1—SPO Model 9336, table size 22" x 28".
1—SPO Model 508, table size 28" x 30".
1—SPO 506—24" x 30" Table, 10" Draw.
3—TABOR 30" x 40" Table, 12" Draw.
4—TABOR 22" x 32" Table, 10" Draw.

Jolt Pin Lift

3—INTERNATIONAL JDP 1600 x 10" draw, 36" x 36" table.
2—OSBORN #559, 25" x 30" Table.
2—MILWAUKEE #2542, 38" x 42" Table.
1—SPO #3058, 22" x 28" Table.
1—SPO #3102—42" x 50" Table.

Pin Lift

9—INTERNATIONAL & B & P Speed Draw. Used with Sand Slinger. Cap. 600 to 2000 lbs., up to 30" x 40" flasks.

Jolt Squeeze Pin Lift

1—MILWAUKEE #125, 21" x 27" Table.
1—OSBORN #712-V, 18" x 26" Table.
2—OSBORN #710-J, 17" x 21" Table.
4—INTERNATIONAL PKL, 17" x 26".
1—INTERNATIONAL PK-20, Size 20" x 8".
1—OSBORN 716 PV—22" x 34" Table—16" dia sq cyl.

CONVEYORS

Steel Apron

9—JEFFREY & LINK BELT 24", 30", 36", 42", & 48" Widths. Lengths built to your specifications, with reducers & motors.

Oscillating & Vibrating

1—LINK BELT 48" x 154', 20 HP Motor.
4—LINK BELT 30" W x 45', 65' & 80'.
7—JEFFREY TAYLOR No. 5 Vibrating Feeders 24" wide x 7'.

Roller

2500' MATHEWS 6", 12", 18" & 20" wide. 2⅞" dia. roller, 1½" hex shaft centers, 4" channel.
500—MATHEWS 12" & 36" wide, 3½" dia. 1" hex shaft on 6" centers, 6" channel.

Mold

1—LINK BELT 36 cars 4' x 5', 190' track, with automatic dump. New 1952.
3—LINK BELT 88 Cars 20" x 48", 350' track, with automatic dumping.

Belt

LINK BELT & JEFFREY 18", 24" & 30" wide. Flat or trough idlers, all Timken bearings. Built to your specifications. Can be equipped with molders hoppers & Ploughs.

MOLDERS HOPPERS & STORAGE BINS

7—NATIONAL & LINK BELT Storage Bins, 60 to 150 tons cap.
42—MOLDERS Hoppers 1½ ton cap.
3—NEWAYGO HS-7-GT Twin Hopper Handy Sandy's.

SAND MULLERS

1—B & P #40 Speed Muller, 6 cu. ft.
1—B & P #50, Speed Muller, 9 cu. ft.
1—B & P #60, Speed Muller, 12 cu. ft.
2—B & P #70, Speed Mullers, 18 cu. ft.
1—CLEARFIELD #404, 4 cu. ft. batch
2—CLEARFIELD No. 610 w/skip hoist loaders, 10 to 14 cu. ft. batch.
1—DRAVO-DOYLE 6 cu. ft. cap. Port.
1—LINK BELT 48" x 8' Paddle Type.
1—PEKAY No. 160-1-24 Mixer Muller, single stage for 24" belt, 230 TPH
1—SIMPSON #0, Style B, 175 lb.
1—SIMPSON #1½, Style UD, 700 lb., w/loader
1—SIMPSON #2, Style C, 1500 lb., w/loader
3—SIMPSON #3, Style C, 3000 lb., w/loader
3—SIMPSON #3, Style UD, 3000 lb., w/loader
1—SIMPSON No. 1H Style UD—500# batch.
2—Mixer Muller, 6 cu. ft. paddle type.

SAND PREPARATORS

2—NATIONAL #3 Style C Aerators.
6—ROYER Complete conditioning units including Shakeout, Belt Conveyor and Sand Blender.
6—B & P Screenerators, Models S, M & L.
8—ROYER Models, NC-4, NDS, NDP.
6—AMERICAN Sand Cutters, Model M, Sizes 79/60, 89/70, 99/80. All late.
4—AMERICAN Model AA and AM, 45" & 60" Cutting Blade.
1—ROYER S-522-9M Scrap Control 60 ton per hour capacity.
1—AMERICAN "Sand Master," 102"/70" cutting blade—1952.
1—MOULDERS' FRIEND 60" Brush.
1—REDDY-SANDY Model RS-VM.

SANDSLINGERS

1—B & P Motive Jr., 300 cu. ft. tank.
2—B & P Tractor Type 19" head & 16" head, 13' arms. Magnetic towers.
6—B & P Models DB Stationary Sand Slingers, 16", 19" and 22" heads, with 20, 25, 40 and 50 HP motors. All late.
2—B & P Swing Type Slingers 19" head.
1—B & P 2 ton plate feeder.
4—B & P 8 ton plate feeders.
2—B & P 35 ton capacity plate feeders.

SHAKEOUTS & SCREENS

2—LINK BELT 5' x 10', 6 ton cap.
1—SIMPLICITY 4' x 10' Model D.
1—SIMPLICITY 5' x 8', Model D.
1—NATIONAL ENG. 5' x 8' Hex Screen.
1—HEWITT-ROBINS 36" x 78" Vibrex.
1—SIMPLICITY 4' x 10' Model B, Single deck sifter screen, 10 HP motors.
1—HEWITT - ROBINS Vibra - Feeder 30" wide x 60" long.
2—ROBBINS 3' x 4' JF6—2000#
2—ROBBINS 3' x 5' JF6—2000#
1—ROBBINS 4' x 6' JF9—8000#
1—ROBBINS 4' x 5' JF9—10,000#
1—ROBBINS 6' x 10' JF11—20,000#
1—ROBBINS 8' x 10' JF11—30,000#
1—SIMPLICITY 4' x 6' Model B.

SAND BLAST EQUIPMENT

1—AMERICAN 36" x 42", w/Skip Hoist.
2—AMERICAN 48" x 42", w/skip Hoist.
1—AMERICAN 27" x 36" with skip hoist.
1—AMERICAN 48" x 48".
1—AMERICAN No. 1-B Suction Cabinet.
1—AMERICAN #3 Tablast, 4—48" tables.
1—AMERICAN #1 Tablast, 7—14" tables.
1—AMERICAN No. 2A multi-tablast.
1—AMERICAN 20" x 27" Rubber Belt Tumblast.
1—PANGBORN #45, type MT Sand Blast Room 10' L x 8' W x 6' H.
1—PANGBORN No. 53 type EN-2 blast cabinet with dust collector.
1—PANGBORN Model 6-LF, 6' diameter plain table with dust collector.
1—PANGBORN #44NF Shot Blast Room 10' x 9' x 9'.

TUMBLING BARRELS

13—SLY & WHITING. All late type units, with gearhead motors and built in magnetic brake, Timken bearings. Following sizes: 30" x 48", 24" x 48", 30" x 60", 36" x 84", 42" x 72", 48" x 72", 48" x 96", 72" x 120".

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC ROAD—CLEVELAND 10, OHIO—CALL LI. 1-6545

CLASSIFIED ADVERTISING RATES

(Effective July 1, 1956)

POSITION WANTED—Minimum advertisement set solid, 30 words or less, $3.50. Additional words 15c each.

ALL OTHERS — "Help Wanted" — "For Sale" — "Wanted-To-Buy", etc., minimum advertisement set solid, 30 words or less, $8.00. Additional words 30c each.

NOTE—If replies are to be sent to a box number in care of FOUNDRY, add 8 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

INCH RATES PER INSERTION

Single Column 2¼" Wide	One Time	Three Times	Six Times	Nine Times	Twelve Times
1 inch	$ 22.20	$ 21.00	$ 19.80	$ 19.20	$ 18.60
2 inches	43.20	40.80	38.40	37.20	36.00
3 inches	63.00	59.40	55.80	54.00	52.20
4 inches	81.60	76.80	72.00	69.60	67.20
5 inches	99.00	93.00	87.00	84.00	81.00
6 inches	115.20	108.00	100.80	97.20	93.60
7 inches	130.20	121.80	113.40	109.20	105.00
8 inches	144.00	134.40	124.80	120.00	115.20
9 inches	156.60	145.80	135.00	129.60	124.20
10 inches (1 col.)	168.00	156.00	144.00	138.00	132.00
15 inches (½ page)	243.00	225.00	207.00	198.00	189.00
20 inches (2 cols.)	312.00	288.00	264.00	252.00	240.00
30 inches (full page) ..	450.00	414.00	378.00	360.00	342.00

Remittance should accompany advertisement when submitted —Cash Discount 2%, 10 days.

Classified Forms Close the 13th of Month Preceding Issue

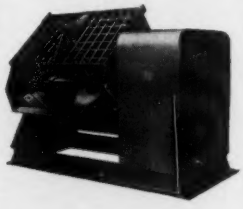
FOUNDRY

PENTON BUILDING • CLEVELAND 13, OHIO

$395
No. 2 Lab. Model
Capacity 100 lbs.

SUPERMIX BETTER CORES AT LOWER COST

CUTS MIXING TIME 50% • MINIMIZES AIR HARDENING
NO HEATING • NO CRUSHING • NO BALLING • EASILY CLEANED
FOR MIXING • CORE SAND • FACINGS • REFRACTORIES
CALL OR WRITE TODAY FOR COMPLETE DETAILS.
UNITED STATES FORGE AND FOUNDRY CO. PULASKI, N.Y.



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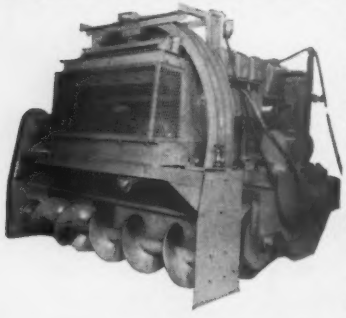
BETTER MAGNETIC SEPARATION and Far Lower Maintenance Cost with RINGLIFT CONDITIONER



Reduces need for mulling. Mixes, adds water, lifts all sand from floor, screens, magnetically separates, aerates. Cools hot sand. Cuts swath to 104", turns in 63" radius. Straddles 24" high x 70" windrows. Most economical machine of its type to buy, operate and maintain. Send for folder.

STATES ENGINEERING CORPORATION
920 W. Berry St.
Fort Wayne, Indiana

Circle 740 on Page 51

FOUNDRY

EDWIN S. CARMAN, INC.

LEE ROAD AT MAYFIELD
CLEVELAND 18, OHIO

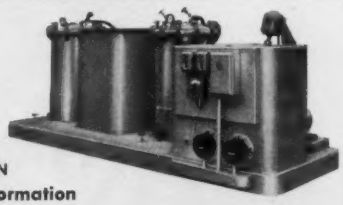
A COMPLETE FOUNDRY SERVICE

MODERNIZATION

Circle 741 on Page 51

PRODUCTION IMPREGNATION CUTS TEST COSTS: ELIMINATE DOUBLE PRESSURE TESTING with IMPREX

"Twin 92", dual autoclave. Get complete penetration of sand or die pressure castings of any metal—coarse or micro-porous.



IMPREX DIVISION 2023-F SOUTH 60th • MILWAUKEE 19, WISCONSIN
IDEAL INDUSTRIES, INC., SYCAMORE, ILL. Write TODAY for complete information

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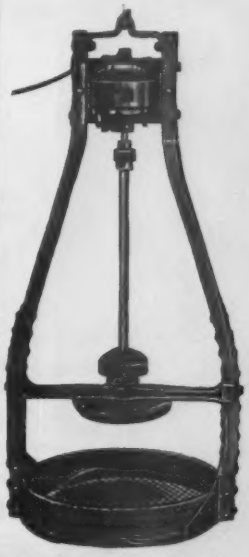

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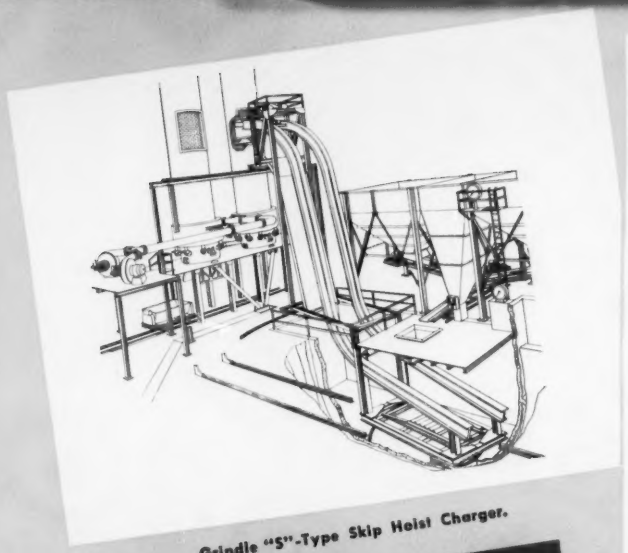

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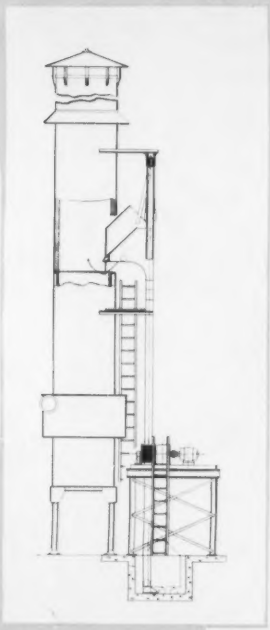

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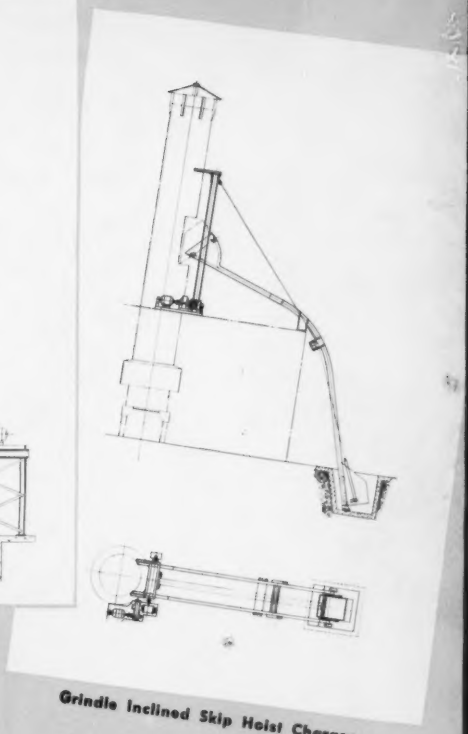

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